JOURNAL

OF THE

INDIAN MEDICAL ASSOCIATION

Vol. XIII *Calcutta, January, 1944* No. 4

# TUMOURS OF THE NASOPHARYNX*

B. TIRUMAL RAO, Rao Bahadur, F.R.C.S. (Edin.), D.L.O. (Eng.),

*From the Department of Ear, Nose and Throat, King George Hospital, Vizagapatam*

## Introduction

It is a general belief that tumours of the nasopharynx are uncommon. Thomson and Negus (1937) in their treatise on Diseases of the Nose and Throat write "Neither simple nor malignant neoplasms are found except rarely in the postnasal space." But from some of the recent references in the literature on the subject it would appear that this optimism is not altogether well founded at least so far as malignant tumours are concerned. Hauser and Brownwell (1938) say that malignant tumours of the nasopharynx are relatively common. Martin and Blady as cited by Jeune and Bayon (1941) estimate that it makes up about 2 per cent of all malignant growths; that is to say, it is at least as frequent as carcinoma of the larynx. They further state that there can be no doubt that many cases die of metastases while the primary tumour is never diagnosed. What is more startling, however, is the relative frequency of malignant disease of the nasopharynx amongst the Chinese at Shanghai and Honkong as well as the domiciled Chinese community in New York. Digby and his associates (1941) express their great amazement at the large number of sufferers from this condition in Hongkong and South China, ranking second in frequency in a list of all cases of malignant disease. In seeking for a predisposing factor in explaining this extraordinary frequency of the disease in Hongkong, they attach considerable value to the hypothesis of Dobson, that the soot-laden atmosphere in the small Chinese dwellings irritates the nasopharyngeal lymphoid tissue and predisposes to malignant disease. If the environment as suggested above, were to play so decisive a role in the extraordinary incidence of this disease amongst the Chinese, one would expect it to be encountered here with equal frequency for there cannot be much difference in the environment in which the mass of Indian people lives from that of the Chinese. It is this fact that aroused my interest and on looking into the case records of the King George Hospital, Vizagapatam, I found that malignant tumours of the nasopharynx during the period from 1929 to 1942 were only 22 as against a total of 250 malignant tumours of nose, throat and larynx. Den Hoed as cited by Stout (1941) gives the figures as 47 in the nasopharynx among 752 malignant tumours of nose, throat and larynx. Portman and Retrouvey as cited by Stout (*loc. cit.*) report that they found only 32 nasopharyngeal tumours among 70,000 patients at the Bordeaux Otorhinolaryngological Clinic. The figures for the King George Hospital, Vizagapatam, are 40 for 60,000 paients seen in the E. N. T. department during the period. It is clear from the above figures that the incidence of nasopharyngeal tumours at Vizagapatam is about the same as in European and American clinics. At any rate, it is nowhere near the startling frequency of the disease at Hongkong and Shanghai. It would appear, therefore, as pointed out by Martin and Blady (*loc. cit.*) that it is not the environment but a true racial heredity that is responsible for the peculiar susceptibility of the Chinese to this disease. While it is comforting in so far as it goes, it would be unwise for us to sit complacent under the belief that the nasopharyngeal tumour is a rarity here.

## Classification

Stout (*loc. cit.*) gave a list of names of 34 different types of tumours occurring in the nasopharynx collected from literature. But in his collection of 82 cases, 12 of these tumour types are represented and of these 8 only are represented by more than one example. Of the benign growths, polypi, fibromata and cysts are the most frequent. Of the malignant growths, epitheliomata and cylindromatous carcinomata are most commonly encountered. The 27 other tumour types are all extremely rare. The types of tumours and their relative numbers seen at the King George Hospital, Vizagapatam, during the last 15 years are as follows:

Benign:

| | | |
|---|---|---|
| Fibroma—Nasal | .. | 1 |
| Fibroma—Nasopharyngeal | .. | 17 |
| Total | .. | 18 |

*Read at the Scientific Section of the XIX All-India Medical Conference, Patna, April, 1943.

| | | |
|---|---|---|
| **MALIGNANT:** | | |
| Sarcoma | .. .. | 1 |
| Fibrosarcoma | .. .. | 1 |
| Lymphosarcoma | .. .. | 1 |
| Endothelioma | .. .. | 1 |
| Adenolymphoma | .. .. | 1 |
| Rhabdomyoma | .. .. | 1 |
| Lymphoepithelioma | .. | 3 |
| Unconfirmed histologically | .. | 13 |
| Total | .. | 22 |
| Grand Total | .. | 40 |

### BENIGN TUMOURS

POLYPI—No dermoid polypi were seen by me during the period under consideration.

But the nasoantral or choanal polypus is common. It is frequently a child or a young adult with a complaint of nasal obstruction, discharge of mucus, snoring and rhinolalia clausa. There is no pain and aural symptoms may altogether be absent. When small it may be mistaken for adenoids or the posterior end of the inferior turbinate. When it is large it may present itself below the soft palate (*vide* Figs. 1 and 2). It may be mistaken for a neoplasm like a nasopharyngeal fibroma. The soft and smooth feel of the polypus, its lighter colour and its polypoidal shape will settle the diagnosis. Further it is quite easily removed by the snare or forceps through the nasal or oral route and the bleeding is negligible. In the few instances when it recurs, the antrum is opened through the canine fossa and the antral attachment of the polypus is dissected off its wall and the main mass of the polypus removed through the oral route.

The polypus is, of course, inflammatory in origin and it is in no sense a neoplasm. It finds a place in this discussion only because it is to be remembered in the differential diagnosis of benign growths of the nasopharynx.

CYSTS—Kully (1935) reports 85 cases of cysts seen by him during a period of 6 years and comments upon the scarcity of reports on this condition in the literature. He attributes this to failure to diagnose rather than to any rarity of their occurrence. He is probably right. Cysts have been occasionally noticed by me but histological exmination was not undertaken to confirm the diagnosis as to their precise nature—retention, degenerative or branchiogenic. According to Kully the latter two conditions are both rare.

FIBROMA: NASAL—There was only one case of a male 35 years of age admitted on 15-11-40 with a complaint of unilateral left nasal obstruction and epistaxis. The growth was just visible by anterior rhinoscopy. By posterior rhinoscopy it was found to fill up and to protrude into the nasopharynx from the posetrior nares. It was about the size of a cashew nut and vascular in appearance. Voice was that of rhinolalia clausa in character. Eustachian obstruction was evidenced by the negative Rinne and lateralisation of Weber to the left. X-ray of the skull showed pituitary fossa to be normal.

The case was treated with radium twice giving a total of 3605 mgm. hrs. The tumour appeared to have completely disappeared. There was some troublesome bleeding after the removal of radium needles on the first occasion.

Histopathological report on a biopsy specimen is:—"Lymphangiofibroma. There are numerous dilated lymphatic spaces."

The patient was seen again, two years after he was discharged cured, with a slight recurrence of his trouble but ultimately lost sight of.

This case is dealt with separately from the subject of nasopharyngeal fibromata the consideration of which follows immediately, because although it has some of the features in common with the latter, the age of the patient and apparent site of origin of the tumour are against its inclusion amongst true nasopharyngeal fibromata.

FIBROMA: NASOPHARYNGEAL—This is a most interesting tumour. It is unique of its kind. It is histologically benign but clinically malignant. It would appear to occur in all races and climes. It is considered as one of the disappearing diseases. Figi (1940) who presents a masterly review of 63 of these tumours seen at the Mayo Clinic from 1-1-10 to 1-1-40 says that few reports in the literature present more than half a dozen cases seen by a single individual. There were 17 cases seen by me at Vizagapatam during a period of about 15 years.

*Etiology*—It is predominant in the male sex. Of the 17 cases, 16 were males and one was a female. In Figi's series, males were 58 and females were 5. It becomes usually manifest at about the time of puberty. It may do so much earlier, however. The youngest in this series was a boy of 8 years (*vide* Fig. 3) and the oldest was a male aged 22.

It is said to regress and spontaneously disappear from the age of 25 years when the skeletal development is completed. After this period they are rarely met with. This definite predeliction for age and sex and the tendency to spontaneous regression, point its origin to some developmental anomaly at the time of puberty or thereabouts.

SITE—The next most notable feature about this tumour is the comparatively inaccessible site of its origin. It may arise from any part of the fibrous tissue of the nasopharynx. The most common point appears to be from the periosteum of the roof of the nasopharynx and generally to one side of the middle line. In one patient it appeared to have originated from the sphenoid sinus. The basilar process of the occipital bone, the body of the sphenoid, the anterior surface of the upper two cervical vertebræ, the internal pterygoid plate, the region of the foramen lacerum medium, the pterygomaxillary fossa are the other possible sites of origin.

PATHOLOGY—The base is usually small but it may be very broad. The tumour grows and having filled the nasopharyngeal space, it extends by pressing on and causing atrophy of the parts it comes in contact with, even absorbing bones. Besides the attachment of its origin, a fibroma acquires secondary insertions through ulceration and adhesions with the neighbouring structures. The size and extent of its growth thus varies greatly. In only three cases in this series it was limited to the cavity of the nasopharynx with no adhesions. Its increase in size gave rise to a bulging of the soft palate in

5 cases. Its intranasal prolongations on one side pressed the septum against the lateral wall of the nose in 4 cases. Its extensions into the retromaxillary fossa, antrum and the orbit resulted in a prominence of the cheek in 3 cases and proptosis in 4. The cranial cavity appeared to have been invaded in 2 cases either through absorption of bone from pressure or through its fissures and foramina giving rise to symptoms of increase in the intracranial tension such as headache and vomiting. There was 6th nerve palsy in one case. The tumour is found covered with normal mucous membrane and ulceration is unusual, except as a result of diagnostic or therapeutic operative procedures. The growth consists of fibrous tissue rich in blood vessels. It is often reported by the pathologist as an angiofibroma. The walls of the vessels are very thin and devoid of the contractile muscular coat. Embedded as they are in the fibrous tissue, the vessels do not collapse when cut and bleed profusely. The vessels are more numerous and larger in size in the central areas than at the periphery. It has no definite capsule. Hence it is important that the tumour peels off completely from its attachments and does not break through its mass. Round cells resembling those of a sarcoma are found between the fibres of the connective tissue. The cellular portion may be mistaken in appearance for that of a fibrosarcoma. Figi (*loc. cit.*) says that there is no evidence in his series of the tumour having undergone a definite sarcomatous change. On the other hand, when once the skeletal development is completed the tendency is towards spontaneous involution.

*Symptoms*—Obstruction to breathing through the nose is perhaps the earliest and the most constant symptom. Recurrent attacks of bleeding from the nose, often so profuse as to render the patient anæmic, are common. Nasal discharge, headache, rhinolalia clausa, anosmia, otalgia, and deafness are also some of the more frequent symptoms. In one case, the ear trouble progressed to acute mastoiditis and the mastoid had to be drained.

Later on with further extension of the growth, proptosis, bulging of the cheek, broadening of the bridge of the nose, epiphora and frog-face deformity become manifest Deglutition is markedly interfered with and respiration may be so impeded by the tumour filling up the pharyngeal space as to require a tracheotomy. This had to be done in two instances in this series. In addition to anæmia, the general condition of the patient is marked by cachexia, mental hebetude and somnolence.

*Signs*—The tumour presents a nodular or lobulated appearance, greyish or fleshy and reddish in colour and often pushing and bulging down the soft palate. Its nasal extensions, more often unilateral than bilateral, are seen by anterior rhinoscopy. The tumour is felt to be hard and of cartilaginous consistency. The attachment in the nasopharynx may be so broad, sessile and firm that the mass is immobile. There is a definite pedicle sometimes and the mass is freely movable as happened in one case in this series that it came away with the first attempt at biopsy with a Luc's forceps. It must be mentioned here, however, that this patient died a week later of severe secondary hæmorrhage. The lasting lesson, I learnt from this tragic experience is corroborated by Figi (*loc. cit.*) when he says that biopsy should generally be done in all tumours of upper respiratory tract but this tumour is an exception to this rule. However, if the tumour is actively growing, recurring or otherwise suggestive of malignancy, biopsy should be made. The chief objection to biopsy is the uncontrollable bleeding. The history and clinical picture as a rule furnish sufficient data for a definite diagnosis.

Transillumination generally shows opacity of the antrum and radiography the existence of secondary catarrhal changes in one or more of the accessory sinuses. The mastoid antrum and cells may show similar changes. Ophthalmoscopy was done in some cases but no fundal changes were ever reported.

*Differential Diagnosis*—The conditions likely to be confused with it are—1. Antrochoanal polypus. 2. Fibroma of nasal origin. 3. Fibrosarcoma. 4. Epithelioma.

Choanal polypus presenting in the nasopharynx is lighter in colour, of softer feel and much less vascular. It has always a distinct and narrow pedicle and is easily removed. Fibroma of nasal origin occurs at a later age and is of slower growth and much less vascular. Fibrosarcoma is difficult to differentiate except by biopsy. Epithelioma generally occurs at a later age and glands are enlarged. Frog-face deformity is more often associated with a nasopharyngeal fibroma.

Adenoids, retropharyngeal abscesses, hypertrophied posterior ends of the turbinates have as well to be considered in arriving at a diagnosis.

*Treatment*—The tendency to natural regression, a general characteristic of these tumours, cannot be relied upon sufficiently to justify delay in treatment, except probably when the patient is approaching the age of their involution, and when there are no marked symptoms. A fatal termination is an ever present danger. Death may result from inanition, choking, sepsis hæmorrhage and cerebral involvement or some intercurrent disease.

Figi (*loc. cit.*) remarks that treatment at the Mayo Clinic has undergone considerable change during the last 25 years. Prior to 1915, surgery was almost the universal method of treatment. Its disadvantages were high mortality, frequent recurrences and repeated operations, mutilation and uncontrollable hæmorrhage. Kobylenski had 3 deaths in a series of 10 cases. The Mayo Clinic experience was no more satisfactory. Radium has, therefore, supplanted surgery ever since 1915, at the Mayo Clinic. From the year 1924, surgical diathermy is also being employed with increasing frequency either alone or combined with radium. Roentgen ray treatment was done only for one patient who was a hæmophilic. The mortality was nil and the treatment has proved completely satisfactory.

At the King George Hospital, my first case was a boy aged 15 years with a huge nasopharyngeal growth. A tracheotomy had to be done for the relief of dyspnœa and the mastoid had to be drained. He finally died of hæmorrhage at an operation for extirpation of the tumour inspite of the preliminary ligature of the external carotid artery. The second patient was a boy of 16 years presenting a fair-sized tumour through a complete cleft palate which made the removal of the tumour easy and successful.

In 1931, we got our radium and ever since radium treatment has been the method of choice. After radiation, marginal portions of the tumour are removed occasionally with benefit and the results have been very satisfactory, though two patients,

who had already showed symptoms of intracranial involvement died, one of meningitis and the other of hyperpyrexia, after removal of the implanted radium. The tumour completely disappeared in four cases. One of the patients discharged cured who had a tracheotomy done for the relief of dyspnœa, was seen again six years later with no recurrence of the trouble. In four more cases, there was great relief from the symptoms and considerable reduction in the size of the tumour.

One of the patients discharged relieved came back four years later with an aggravation of his old condition. There was some improvement again with two radium applications. But the deformity of the nose, proptosis and swelling of the cheek were still there so that an attempt was made, most ill-advisedly, to enucleate the remaining mass of the tumour by splitting the palate under intratracheal anaesthesia. It proved disastrous the patient having died of shock and hæmorrhage (*vide* Fig. 4).

The case of a boy who died from secondary hæmorrhage has already been mentioned. Treatment by surgical diathermy was not undertaken by me for this condition uptil now. Figi (*loc. cit.*) admits that it is attended with greater hazard than irradiation.

Otty, as quoted by Wishart (1941), reports of a case of naso-pharyngeal fibroma treated with sodium morrhuate injections with great relief of symptoms. I have not tried sodium morrhuate but at present I have got a case under my care, who came in with a recurrence after having been discharged relieved two years back. Having had no radium with me now, I have given injections of monochloracetic acid. The tumour showed considerable reduction in size and the symptoms of obstruction were greatly relieved. There was no appreciable discomfort after the injections.

The following is an analysis of the cases under review:

| | | |
|---|---|---|
| Total no. of patients | .. 17 | (male 16, female 1) |
| No. treated surgically | .. 3 | (cured 1, relieved 0, died 2) |
| No. treated surgically and with radium | .. .. 5 | (cured 2, relieved 2, died 1) |
| No. treated with radium | .. 5 | (cured 1, relieved 2, died 2) |

Four patients did not avail of the treatment.

From the above-stated experience at the King George Hospital, I am in general agreement with Figi, who bases his conclusions after a most exhaustive and thorough study of a far larger collection of cases at the Mayo Clinic during a period of thirty years. The conclusions are: 1. Biopsy is dangerous and has to be given up except when absolutely necessary. 2. Surgical removal is attended with considerable risk to life. 3. Radium is the treatment of choice.

Latterly, diathermy is occupying an equally important place as radium at the Mayo Clinic. Figi (*loc. cit.*) states that both radium and diathermy treatments have to be done in several stages and complications are less likely if so carried out.

Injections of monochloracetic acid and sodium morrhuate on occasions seem to have a place in the treatment of these tumours.

(*To be continued*)

## THE AZYGOS LOBE OF THE LUNG

T. K. RAMAN, M.D., D.T.M. (CAL.),

*From the Department of Medicine, Andhra Medical College and King George Hospital, Vizagapatam*

The azygos lobe of the lung has been named by different writers as the lobe of Wrisberg, the lobe of the azygos vein, or the accessory lobe of the azygos vein. Wrisberg in 1778, as quoted by Cairney (1923), first gave the anatomical description of this lobe and his case showed in addition an accessory lobe on the left side in relation with the left superior intercostal vein. Stibbe (1919) collected 22 cases from the literature and reported one of his own. Cairney (1923) reported two cases observed in the dissection room of the anatomy theatre and one in the porpoise. Wessler and Jochs in 1923 as quoted by Stoloff (1929), described the radiological appearances in the right upper lobe and presumed that the shadow was due to some congenital unknown anatomical structure. Velde in 1927 as quoted by Stoloff (1929) observed these shadows and suggested that it might be due to azygos lobe of the lung. Bendick and Wessler (1928) confirmed by postmortem that the shadow was produced by the azygos lobe in two of their fifty cases. Subsequently several authors have described this condition. Emil (1929) described 3 cases; Litten (1929) 6 cases from a series of 8000 roentgenograms; Gianturco (1929) 3 cases; Illig (1929) 12 cases; Stoloff (1929) 6 cases; Jalet (1930) 16 cases from 1,600 roentgenograms; Volmar (1930) 10 cases; Zawadowski (1931) 17 cases; Oroz (1932) 7 cases from 900 roentgenograms and Cockrayne (1933) 2 cases; Vita (1933) one case; Bottaliga (1933) 3 cases; and Choussat (1938) one case.

*Anatomy*—In the embryo the azygos vein (posterior cardinal vein) receives a communicating branch from the right upper limb, which should disappear before the heart descends into the mediastinum. When this does not occur the azygos vein draws a fold of parietal pleura with the descent of the heart and divides the upper lobe into two. The medial lobe is called the azygos lobe. The occurrence of this lobe on the left side in relation with the left superior intercostal vein has been observed only in two cases so far. Stibbe (1919) classified azygos vein under three headings according to the position of the fissure:

Type A—The fissure is more or less horizontal and cuts the lateral surface of the lung below the apex.

Type B—The fissure is practically vertical and cuts the apex.

Type C—The fissure is vertical and cuts a small tongue-shaped lobe from the medial surface of the upper lobe.

The accessory lobe is supplied by a small branch from the eparterial bronchus showing thereby that the abnormality is not due to defective development of the lung. In animals (porpoise) the lobe of the azygos vein on the right side was first observed by Allen in 1882 and has been confirmed by Mathews (1898), Geddes (1910) and Holtby (1915), as quoted by Cairney (1923).

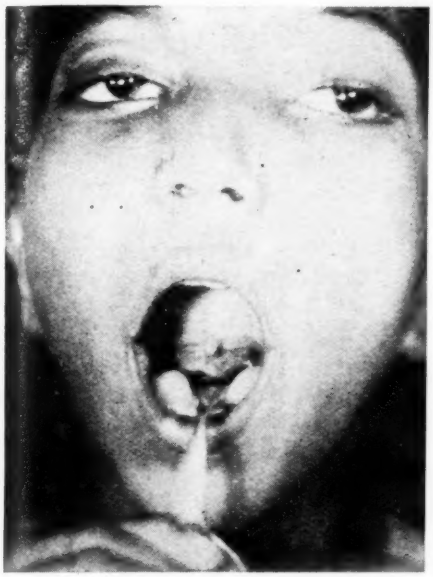


FIG. 1.—Hindu, F.C. 10 years
Antrochoanal polypus protruding below the soft palate and seen through the right nostril also.

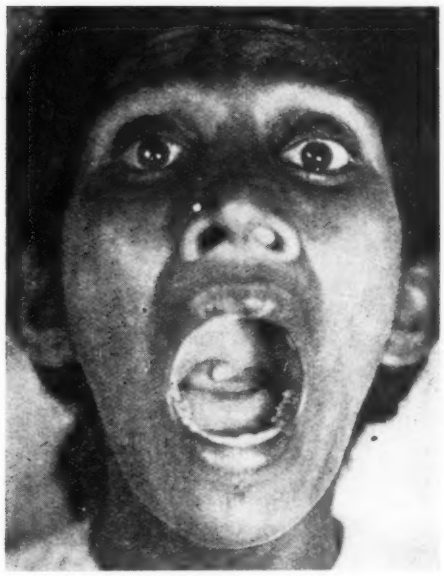


FIG. 2.—Hindu, F. 30 years
Antrochoanal polypus protruding below the soft palate and seen through the left nostril also.

FIG. 3.—Hindu, M.C. 8 years
Nasopharyngeal fibroma completely filling up the nasal cavity seen through the right nostril. Appears to arise from the basisphenoid. The condition was relieved by radium therapy.

FIG. 4.—Hindu. M. 23 years
Recurrent growth—nasopharyngeal fibroma. The patient died of shock and hæmorrhage at operation for extirpation of the tumour by splitting the palate under intratracheal anæsthesia.

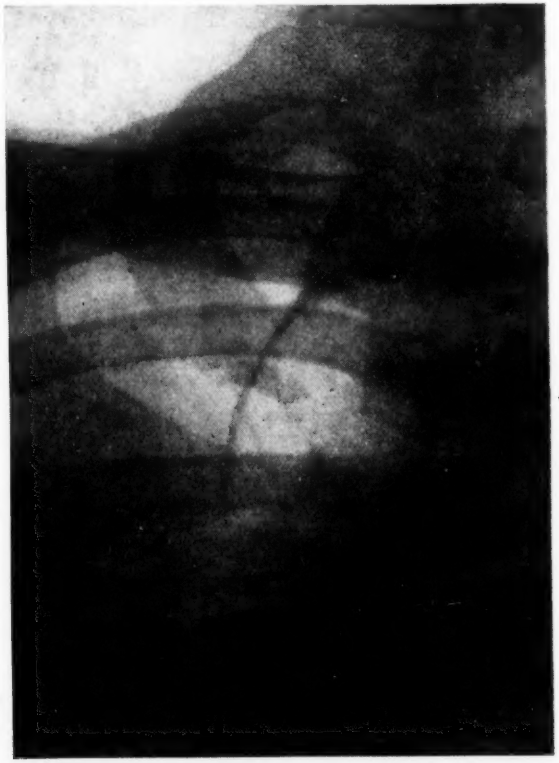


FIG. 1.—Showing the azygos lobe of the right side. Meso-azygos intermediate in position between Stibbe's type B and C. The lower portion of the lobe is affected by pleurisy (Case 1).

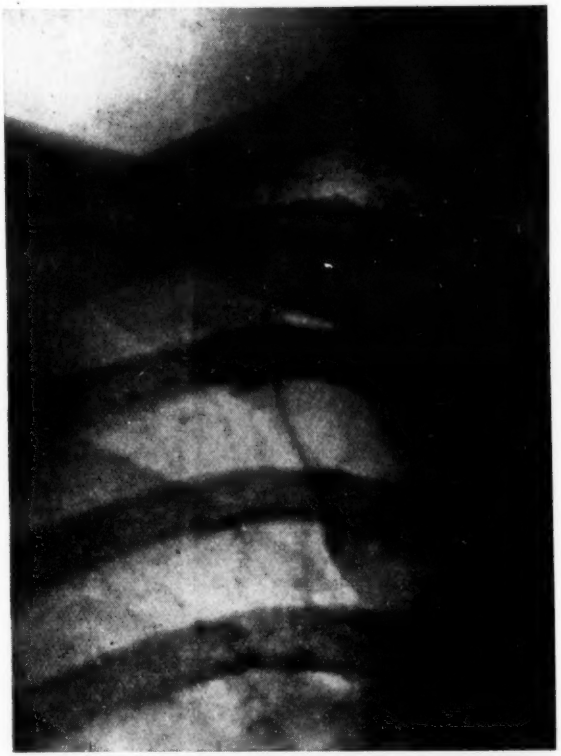


FIG. 2.—Showing the azygos lobe of the right side. The upper level of the shadow is at the apex. Stibbe's type B (Case 2).



N.B. In the illustrations the fine line representing the meso-azygos has been slightly accentuated for the purpose of reproduction—EDITOR, *J. Indian M.A.*

Engraved & printed by
The Bengal Autotype Co , Cal.

A brief summary of the two cases seen by the author in King George Hospital, Vizagapatam, is given below:—

*Case 1*—J. R., Hindu male, aged 28 years, was admitted on 11-3-43 with signs and symptoms of toxic cirrhosis of the liver and later developed pleural effusion of the right side. Radiological examination on 8-4-43 showed the azygos lobe of the right side in addition to the pleural effusion. (Fig. 1). In this case the point of deviation of the azygos vein could not be observed since the level of the pleural effusion was high up. The azygos lobe itself is affected by the pleurisy. The patient died but unfortunately postmortem was not available.

*Case 2*—G. N., Hindu male, aged 30 years, was admitted on 29-7-43 with signs and symptoms of pleurisy of the left side. Routine radiological examination of the chest showed the azygos lobe of the right side in addition to pleurisy of the left side. The azygos vein (the shadow produced by the reflected pleura) deviated to the right at the lower margin of the fourth dorsal vertebrae. (Fig. 2). Screening showed that the expansion of the azygos lobe during inspiration was a little less when compared with the movements of the left apex. The lobe corresponds to Stibbe's type (B) since the upper level of the shadow is at the apex.

## Discussion

There is no physical sign by which the presence of the azygos lobe can be diagnosed clinically. Radiological examination alone will reveal its presence. The picture is usually taken for some other condition either of the heart or of the lung and the presence is detected by the typical shadow produced at the apex of the right lung. The shadow is not produced by the azygos vein but by the pleural reflection over the vein. Screening will reveal the azygos lobe and was first observed by Jallet (1930, *loc. cit.*) in two of his cases. Pleural bands at the right apex can produce pictures simulating the azygos lobe as shown in a patient who was suffering from aortic regurgitation. The picture was taken for the heart condition. Barsony and Koppenstein (1929) reported two cases with streak formation at the right apex. Radiographs taken in different positions showed that the shadows were produced by the reduplication of the pleura. Zawadowski (*loc. cit.*) found in one of his cases spina bifida occulta of the first dorsal vertebra, cervical rib of the right side, and bifurcation of the first (normal) rib.

A review of the literature shows that the azygos lobe is a rare condition (172 cases in all). Only two cases were observed in the King George Hospital, Vizagapatam, during the last ten years. With these two, the total number will be 174. In a series of 750 bodies dissected in the anatomy department of the Andhra Medical College not even one case was observed. Majority of the cases reported are from tuberculosis cases, as radiological examination of the chest is more often done on tubercular patients. This lobe is subject to the same pathological conditions as the normal lung as shown in Case 1 and in a case of Bendick and Wessler (*loc. cit.*) where effusion occurred in the azygos fissure in a case of carcinoma of the lung. Choussat (*loc. cit.*) reported a case of tuberculosis of the azygos lobe clearly visualised by artificial pneumothorax

## Summary

1. The literature of the azygos lobe of the lung is reviewed and the development of the lobe is described.

2. Two cases of azygos lobe of the lung are described. In both the cases the diagnosis was made by the radiological appearances.

## Acknowledgments

The author is thankful to Dr. C. Benjamin for the radiographic films.

## References

Barsony, T. and Koppenstein, E.—*Am. J. Rœntgenol,* **22**:371, 1929.
Bendick, A. J. and Wessler, H.—*Ibid.*, **20**:1, 1928.
Bottaliga, M.—*Radiology,* **22**:649, 1933.
Cairney, J.—*J. Anat.*, **58**:54, 1923.
Choussat, H.—*Radiology,* **31**:782, 1938.
Cockrayne, E. A.—*Proc. Roy. Soc. Med.*, **26**:148, 1933.
Emil, St. G.—*Am. J. Rœntgenol.*, **23**:96, 1929.
Illig, W.—*Ibid.*, **22**:78, 1929.
Jallet, J.—*Ibid.*, **24**:325, 1930.
Litten, F.—*Ibid.*, **22**:281, 1929.
Oroz, D.—*Am. J. Digest. Dis.*, **47**:672, 1932.
Stibbe, E. P.—*J. Anat. Physiol.*, **53**:305, 1919.
Stoloff, E. G.—*Am. J. Rœntgenol.*, **22**:466, 1929.
Vita, G.—*Radiology,* **22**:648, 1933.
Volmar, F.—*Am. J. Rœntgenol.*, **24**:699, 1930.
Zawadowski, W.—*Ibid.*, **25**:109, 1930.

## NOTICE

Capt. K. L. Saha, M.B., has offered a gold medal for the best paper on any subject in Pharmacology to be read at the 1944 session of the All-India Medical Conference.

Research workers and investigators who intend to submit a record of their work on this subject, are requested to send six typed copies of their articles to the Hony. General Secretary, Indian Medical Association, 23, Hindusthan Buildings, Calcutta, so as to reach the latter by the 30th September, 1944.

16-12-1943.

P. B. Mukerji,
*Hony. General Secretary,*
Indian Medical Association.



Journal of the Indian Medical Association

January, 1944

# THE PROBLEM OF LATE, QUIESCENT AND LATENT SYPHILIS

K. K. CHATTERJI, M.B.E., F.R.C.S.I., LIEUT.-COLONEL, I.T.F.,
*Hony. Consulting Venereologist, Chittaranjan Hospital, Calcutta.*

(*Continued from previous issue*)

THE LOCOMOTOR SYSTEM: Syphilis of the locomotor (skeletal) system, that is of bones, joints (including articular and periarticular structures), bursæ, muscles and tendons will be considered now. Bone lesions are common in early as well as in late and latent syphilis; there are, however, certain points of difference in pathological and clinical details. Their frequency can be explained by the architectural arrangement of bones with rich lymph supply in the osseous and periosteal tissues, slow circulation, the more so in the long bones of the limbs due to their dependent position and greater liability to strain and trauma. Thus once treponemal infection takes place, osseous tissue would seem to be a suitable reservoir of treponemes and they would flare up at the slightest exciting cause. Constitutional conditions, trauma and strain lower the immunity mechanism and secondary septic infections complicate the pathology, work mischief and obscure diagnosis. Spirochetes have been demonstrated by Neisser (1911) in the bone marrow a few hours after infection. They have also been found in the periosteum in cases of syphilitic periostitis. Syphilotoxic etiology of joint syphilis cannot any longer be entertained since spirochetes themselves have been demonstrated in synovial fluid by Chesney (1926) and experimental inoculation with it of animals have given positive results. It is also an interesting fact that cases in which blood serum gives negative results, synovial fluid is positive. In cases of probable parental transmission, Bertarelli (1935) has demonstrated spirochetes in epiphysial lines in the fœtus with evidences of osteochondritis. In view of the detention and storage of spirochetes in the medulla, examination of fluid drawn from it by bone puncture was suggested and some positive findings reported; I have not been fortunate in several cases of sternal punctures, perhaps the medulla of long bones is a more suitable nidus. These facts explain a long quiescence or lateness and latency in skeletal manifestations, particularly in cases of osseous syphilis in which unanticipated phenomena appear either as eruptive or gradual processes. This may also explain marked Herxheimer's reaction in these cases. I can recall cases of quiescent skeletal syphilis producing marked therapeutic reactions after N.A.B. injections, a source of much concern and alarm to the patient. Cases explaining these may be interesting.

*Case Report 28*—An aviation pilot had a knock on his knee while alighting from his machine. Local treatment relieved the pain, but the inner aspect of the knee continued to remain tender and he would limp. As this persisted a skiagram was taken which showed an inflammatory lesion at the medial tibial tuberosity and as this roused suspicion, S.W.R. and C.S.F. tests were done, both of which proved the suspicion well founded. Syphilotherapy gave him steady and permanent relief and rendered him fit for his duties.

*Case Report 29*—A college student without any history of acquired infection was found confined to bed due to pain in the left hip. He was greatly depressed for being forced to interrupt his studies in college. Skiagrams did not reveal abnormalities in the joint elements. He consulted many eminent surgeons and a provisional diagnosis of 'early tubercular hip' being made, immobilisation was recommended. My examination: Good deal of pain in the neighbourhood of the hip, but passive movement of the joint was not painful. Some limitation of extension. On digital exploration per rectum: Small irregular elevation on the pelvic wall near the left ischial spine, tender on palpation. On close examination of the skiagram this spine had a darker shadow than the right one, suggesting periostitis of proliferative type. Though the possibilities of heredosyphilis was talked out at first, S.W.R. test was eventually agreed to and turned out to be positive. The pelvis was immobilised and surgical rest imposed; bismuth injections commenced. The pain steadliy subsided. He soon regained his lost weight and even put on an extra stone. He is now a graduate of the University and a good sportsman.

These are two of many cases of osseous latency in which syphilitic etiology was quite a surprise to the patient and his doctor. Late osseous syphilis has some association with past cutaneous syphilis but neuro-syphilis is rare in those suffering from skeletal syphilis. Thus syphilis of the osseous system seems to have a protective influence on the nervous system, though this protection is not as marked as it is afforded by cutaneous syphilis.

The *pathology* of skeletal syphilis is rather interesting. The changes are preeminently of a proliferative, hyperplastic type. The osteoplastic character is almost universal and though osteoporosis is a more or less marked feature in cranial and flat bones, the initial changes are hyperplastic in nature. Bone lesions are less specific than cutaneous lesions. Periosteum is most frequently affected, 50 per cent, particularly in late heredosyphilis. It is of the linear filiform or fringy character due to subperiosteal infiltration and later of reticulated type. Granulations form superficially and work deeper into the tissue. Syphilitic granuloma may either lead to osteoporosis or undergo gummatous changes formerly called 'periostitis gummosa'.

Osteomyelitis is the next in order of frequency, 25 per cent. It is a slow and comparatively mild process as compared with the other forms. Secondary pyococcal infection would, as is to be expected, initiate progressively destructive processes with suppuration, foul discharge and sequestration.

Osteitis proper is a rarer condition. There may be an irregular diffuse thickening of the cortex or a local necrosis particularly if it is a condition of osteoperiostitis. Juxtaarticular nodules of the tropical variety (in the Far East) was originally mentioned by Lutz (1891) described by Jeanselme (1924) and by Chatterji (1927) associating treponemal etiology with the condition. These fibrous outgrowths at the articular ends of bones originate from the periosteum and later undergo ossification like exostoses (osteophytes).

*Case Report 30*—A science scholar, 27 years, married, highly intellectual and of a neurotic disposition. Father confidentially admitted that he had treponemal infection long before the birth of this son and had indifferent treatment. Patient complained of pain in the right knee. Report on skiagram taken six years previously: 'Triangular bony overgrowth medial aspect, lower end right femur pointed and directed medially and backwards. Fine wavy cortex continuous with femur and its cancellous structure, similar to femur. Exostosis at lower end of femur.' He consulted a physician who gave him a long course of calcium orally and parenterally. On examination: Right knee slightly larger than the left; on palpation, there was a mass on the posterolateral aspect of the femur, tender on pressure. Movement of joint free and without pain. Second skiagram taken six years later. Report: The triangular bone is condensed, shadow denser than in the former skiagram (perhaps explainable by calcium therapy). Treatment: Antisyphilitic (arsenic) and shortwave inductothermy. Patient found the swelling diminishing and the tenderness getting less.

Prenatal latency is characterised by osteochondritis, 90 per cent, with eypiphysitis and epiphysiolysis; periostitis is seen in 70 per cent and osteomyelitis in 50 per cent. Long bones are mostly affected; lesions of flat bones, if present, are generally co-existent conditions. Anæmia, occasionally of severe types, are associated with these. Diagnostic indications are skiagrams, associated conditions such as anæmia, keratitis and other collateral evidences such muco-cutaneous lesions and associated joint involvements including Clutton's joint. Tibial and clavicular lesions and dactylitis are worth investigating. Prenatal latency accounts for some cases of flat foot.

*Case Report 31*—A girl aged 8 years. Father gave a history of infection, but said he was cured by what he thought was an adequate treatment and then got married. The girl had pains in the feet and ankles which persisted in spite of orthopœdic measures by surgeons. As she also complained of sore throat, an examination disclosed mucous patches. She also had visual disturbances and keratitis. It was an extreme case of pes planus. S.W.R. 5/10. A course of bismuth injections and metal flat foot supports relieved her of the pain. She could walk better and without pain. She, however, commenced to put on weight which was not altogether desirable in the situation.

Cases of delayed union and non-union of fractures are not uncommon experiences and when otherwise unaccountable, the possibilities of a latent treponemal factor is worth investigation.

*Case Report 32*—A child's nurse sustained a Colles' fracture which was not uniting in spite of splints and plaster; skiagrams indicated deficient osteoplastic callus. The nurse had got extragenitally infected while attending to this heredosyphilitic child with pemphigoid syphilide. The father denied infection but the mother had several miscarriages. N.A.B. followed by bismuth injections expedited callus formation and resulted in good union.

We are not infrequently consulted for similar cases of inadequate callus formation and delay in repair of fractures. Not in all cases is there deficiency of calcium. Diagnostic investigations are to be made and if indicated, bismuth and arsenic treatment adopted. I have noticed skiagrams taken after treatment revealing darkening of the shadows and have wondered if part of it, at least, is due to deposits of bismuth. In some cases, particularly in the young, supplementary treatment with calcium and vitamin D with U.V.R. exposures and hydrarg inunctions would further facilitate union.

There are some special features in the latency of joint affections. Trauma is often a predisposing factor by initiating pathological processes in a clinically quiescent joint. There may be indolent swellings due to hydrathrosis and thickened capsule. The functional impairment is not commensurate with the involvement of the joint, or its altered contour. Pain is boring in character, not confined to the joint, but spreads to the bones, is worse at night and may quite disappear in the morning. Good functional results from treatment is often spectacular though unfortunately relapses are not infrequently prompt. These conditions are notoriously resistant to the usual treatment for articular rheumatism. W.R. of joint fluid may be more strongly positive than S.W.R.

*Case Report 33*—Two collegians sprained their knees at their annual sports meeting. There was effusion and pain. They were both treated with immobilization, salicylates and iodides. While one of them responded to this reasonably, his friend's improvement was unsatisfactory. Though his S. W. R. was negative, the first two injections of arsenobenzol gave him prompt relief; he has since had a complete course, but there are threats of return of pain and he takes iodides and rubs a mercurial unguent which relieves it.

Late syphilitic involvement of periarticular structures are occasionally confusing, particularly in heredosyphilis. Investigations into parental history and accounting of obscure lesions elsewhere including bone and joint skiagrams often yield clues to diagnosis. The following case is interesting.

*Case Report 34*—A young lad hurt his left elbow by a fall. There was pain and as a fracture was diagnosed, it was immobilised by plaster casing first, later passive movements. On examination: Elbow swollen, some effusion and movement limited. Skiagram disclosed periostitis with erosion of articular cartilages. There were some hereditary stigmata. Mother had some miscarriages. Father gave negative history. N.A.B. and hydrarg inunctions reduced the swelling and restored joint functions.

Bursitis and lesions of other soft tissues such as muscles, fasciæ and tendons are rare in late syphilis. Our interest lies in differentiating syphilitic lesions from others. Myalgias with nocturnal exacerbations are common in early syphilis. Tenosynovitis and tendinitis are generally bilateral in late syphilis. Syphiloma of muscles and fasciæ with gummatous degeneration is not so uncommon and often treated surgically with discouraging and sometimes disastrous results, but yields promptly to antisyphilitic treatment. Sometimes fibrosis takes place causing contractures of soft tissues. This has been seen

in the biceps. Syphilitic bursitis may commence as a slow variety of syphiloma and then break down as a gumma. Diagnosis is not infrequently difficult. These conditions have been confused with neuritis, myalgia, lumbago, sciatica, renal calculus, etc. Here are some illustrative cases:

*Case Report 35*—Mr. G., a middle-aged planter, fond of riding and shikar, said that he hurt his 'seat' as his pony stumbled while taking a nullah. The initial pain subsided but a mass developed slowly in his left gluteal region; it was hard at first, then softened and became increasingly tender. Shooting pain down the thigh. The swelling commenced to increase in size and spread. Hip joint trouble was suspected and the joint immobilized. Salicylates and local applications had little or no effect. Iodides seemed to give some relief. Radiologist's report negative to bone and joint involvement but when contrasted with the opposite side an ill-defined haziness in the soft tissue zones. Some evening rise of temperature and deep semifluctuation on palpation. Treatment: Incision, tenacious adherent sloughy tissues scraped. Prolonged dressing and confinement to bed was irksome to the sportsman and he ran down in health. He denied history of infection but a history of miscarriages was present in his wife. Some lymphadenitis. S.W.R. was doubtfully positive. Hydrarg and iodides commenced; some improvement. A provisional diagnosis of gluteal bursitis (syphilitic?). Bismuth followed by N.A.B. expedited his progress. This was followed by hydrarg inunctions and diathermy. Wound healed up and he was able to look after his plantations and resume riding. Specific treatment was terminated too early. Years later, it was reported that he died of nervous diseases, apparently C.V.S. and neurosyphilis.

Syphilitic bursitis of prepatellar bursa may be mistaken for housemaid's knee.

*Case Report 36*—A middle-aged woman with a granulating mass on the patella, the result of incision and scraping. Irregularity of tibial borders and some adherent pigmented scars raised suspicion. S.W.R. taken on admission was positive. A course of arsenic and bismuth injections rapidly healed the ulcer.

Tenosynovitis and tendinitis of syphilitic origin are inclined to be bilateral or multiple, whereas those of gonorrhœal and other types are limited to particular tendons only. The adjacent tissues (peritendinous) are also more likely to be involved in the inflammatory and granulomatous processes. Salicylates have no effect but iodides with them are more effective. Antisyphilitic treatment has often a charming effect.

Syphiloma with degenerative changes or not in muscles and fascial planes and in the connective tissue are liable to cause much confusion in diagnosis.

*Case Report 37*—A man aged 42, 3 tumours on the back about the midline. These were incised and drained in a hospital. Sinuses and a discharge continued for a year when he consulted. Sloughy appearance and prolonged discharge raised suspicion. Admitted primary syphilis 20 years previously. S.W.R. positive: arsenic and bismuth injections and ordinary aseptic care of local ulcer rapidly brought about a cure.

*Case Report 38*—A case of chronic backache treated as lumbago and sciatica for years; skiagram negative and no evidence of irritative nerve lesions. Syphilitic myositis on the strength of positive S.W.R. was diagnosed. Antisyphilitic treatment brought about a speedy cure.

*Case Report 39*—An elderly patient with pain in the right lumbar region and a dullness there was diagnosed as perinephritis and suspected renal calculus. Urography negative. Skiagram revealed a diffuse shadow in the lumbar region and a small darker shadow near the pelvis of the kidney which was evidently a calcified lymph node or a phlebolith. History of urethritis and cystitis admitted but not of treponemal infection, though S.W.R. was positive. After satisfactory renal function tests and arsenobismuth therapy the pain and swelling disappeared.

*Case Report 40*—A middle-aged person was admitted with the provisional diagnosis of amœbic hepatitis (supurative?) as he had a painful swelling on the right side of the chest with increased liver dullness and history of dysentery. On admission it was disclosed that he had secondary syphilides for which he was treated with some pills and *sarsa*. Laboratory examination: Entamœbic cysts in stool; S.W.R. positive. Skiagram: A diffuse shadow on right side but not continuous with hepatic shadow. Full doses of iodides relieved the pain. Emetine etc., reduced the liver dullness. The diffused shadow persisted for a time and then disappeared.

Diagnosis of these types of latent manifestations is not always simple. In differentiating these from pyococcal, tubercular, granulomatous and neoplastic diseases, one remembers that in pyococcal and syphilitic infections, proliferative and constructive elements are present, whereas in tuberculosis and malignant disease, destructive processes predominate; neoplasms, of course, replace the tissue with the particular type of neoplastic cells. Some American authors draw a borderline on Weliaminoff's excellent monogram on tuberculosis and syphilis. Cervical lymphadenitis and scars and evidences of pulmonary and abdominal involvements are sidelights in diagnosis. Granulomata as a class and tropical granulomata in particular have their specific characters. Laboratory tests and biopsy are helpful. I have discussed this subject in my book on Tropical Surgery and Surgical Pathology. Sarcomata, particularly the round-celled variety and syphiloma or young gummata sometimes cause confusion. A biopsy when advisable is helpful by studying the distribution, disposition and character of cells and of the giant cells if present as well as their invasiveness. Otherwise, repeated S.W.R. and thearpeutic tests might be helpful guides. In bone conditions, provocative S.W.R. tests occasionally yield support to diagnosis. In my book on Syphilis with Special Reference to the Tropics, these conditions have been described with illustrations. I have since then seen a case of repeated extensive operations for a supposed sarcoma of the jaw in a young patient. As there were mucous ulcers in the fauces, N.A.B. was tried; this therapeutic test was so successful that under further courses of injection the whole mass disappeared and the lad greatly improved in health. Subsequently, his mother's blood proved to be a positive S.W.R.

As has been observed, bone changes in latent syphilis are mainly proliferative without gross interference with the general contour of the bone; it may give long bones a spindle shape such as the sabre bladed tibia, the sternal end of the clavicle and in dactylitis.

Cutaneous lesions if present or their reminders are helpful as there is some sequential association between these and osseous affections; neurosyphilis, however, is not closely associated with skeletal syphilis, the exceptions being Charcot and Clutton joints.

It would perhaps be interesting to study the frequency and predeliction in this connection. Males 57 per cent, and females 43 per cent. History of trauma 25 per cent. A history of dual infection (Neisserian and treponemal) 25 per cent and these cases are not only confusing in diagnosis but render treatment difficult due to the fibrotic changes in the prostate induced by syphilis and the incarceration of the diplococci therein. Periosteal lesions 50 per cent, osseous 25 per cent, all other lesions, joints, myopathia, tendons, periarticular affections etc., 12 per cent to 25 per cent. With reference to the site, cranium 42 per cent, tibia 26 per cent, then the shoulder girdle and other bones. Bone and joint lesion ratio 5 to 1. Nocturnal exacerbation of pain 14 per cent of all cases.

The positive signs in late and latent cases are local manifestations, skiagrams 80 per cent, S.W.R. 70 per cent; in doubtful cases provocative tests, synovial fluid (in joint cases) and bone punctures may be resorted to. S.W.R. is, of course, notoriously negative in Charcot joints. Negative signs in latency are limitation and disability, constitutional symptoms and suppuration unless secondary sepsis has taken place.

Osteocopic pains of early syphilis give place to the characteristic boring pain of late and latent bone and joint syphilis, particularly after strain and trauma. There is a characteristic worsening at night.

Gonorrhœal affection of joints, periarticular structures, muscles and tendons sometimes require differentiation from syphilitic conditions. A detailed examination of the urogenital tract and laboratory tests are of great help, but the possibilities of dual infection, of course, cannot be lost sight of.

In diagnosis, it has to be remembered that while symptomatic aid is greater than the aid of morphological appearances in early syphilis, the condition is reversed in late syphilis, the morphological changes being greater.

In heredosyphilis one looks for signs of osteochondritis.

In treating cases of suspected skeletal syphilis, all surgical interference should be postponed till full investigation has been made. As has been stated before, unnecessary interference may lead to disastrous results. Antisyphilitic treatment gives the patient a chance of cure without operative interference. Surgical interference, if imperative, should be minimal.

LATE AND LATENT CARDIOVASCULAR SYPHILIS: Heart and vascular cases consult the cardiologist, at least in the first instance, who examines him by percussion and auscultation, by pulse and electrocardiographic tracings and sphygmomanometric estimations. He refers him to the radiologist for x-ray screening and skiagrams and to the laboratory for blood, S.W.R. and C.S.F. tests. He compiles his opinion on his clinical findings supported by these reports and when necessary refers the patient to the syphilologist. We shall, therefore, avoid details and deal with some cardinal facts.

The treponemes distribute themselves freely through circulation and while doing so, cause pathological changes in the walls of the blood vessels and perivascular tissues; the extent of damage is disproportionate to clinical and laboratory findings. The early signs are evasive. By the time the bruit, thrill, buzz, whirr and heave, the extended dullness and compensatory disturbances etc., are detected, it has already got late for good therapeutic prospects. Besides, these insidious processes, there are other serious features of cardiovascular (C.V.) involvement, 33 per cent of all fatal cases of syphilis are of C.V. type. In serial autopsies of 105 cases of aortitis, a definite syphilitic diagnosis was made in only 4 and suspicion in 13 more. It has been ascertained that of all cardiovascular diseases, 15 per cent are syphilitic. Of 300 cases of sudden deaths due to heart disease, 60 were from rheumatic and other affections, 101 from syphilitic heart and 139 from syphilitic arteriosclerosis. Langer (1926) in 23,000 autopsies in a German clinic found that 70 to 80 per cent of syphilitic patients had C.V.S. Warthin (1916) who controlled cases by microscopic examination found vascular lesions in over 85 per cent. C.V.S. is three times more frequent in males than in females and is commonest during 35 to 55 years of life. First year to 10 years after infection, there are very little detectable signs; it is commonest 10 to 20 years later, 45 per cent and 20 to 30 years, 30 per cent. This quiescence and veiled beginnings make C.V.S. typically of late and latent character.

Treponema affects the C.V.S. in many ways giving rise to diverse gross and microscopic appearances and their clinical manifestations. For instance, there is the avascular chancre, the non-hæmorrhagic gastric ulcer, stenosis, thrombosis, effusion and hæmorrhage such as of the cerebral vessels, for instance the lenticulostriate artery of the internal capsule, sclerosis of the coronary arteries, arteritis, periarteritis, fibrosis, adhesions, bands, etc. In the large vessels such as the aorta, syphilis gives rise to aortitis and periaortitis which may result in aneurysm, the thoracic aorta, its arch and bulb being mostly affected. Here, the formation of fibrous tissue may give rise to adhesions and bands and obscure symptoms due to pressure and dragging. Lymphadenitis, gummata and inflammatory processes give rise to mediastinitis which may simulate neoplasms so often difficult to differentiate. Degeneration of gummata may further cause obscure symptoms.

*Case Report 41*—A middle-aged active lawyer developed pain and respiratory distress. Clinical examination disclosed a dull area in the thorax and skiagram revealed a shadow; the case was provisionally diagnosed as a thoracic sarcoma with grave prognosis. Deep therapy gave little relief, mercury and iodides better relief, but the case ended fatally from myocardial asthenia.

*Case Report 42*—A Marwari lady used to suffer from a peculiar type of asthma. Iodides alone gave some relief but with mercury relief was more satisfactory. S.W.R. positive. There was a sudden attack of dyspnoea and she got confined to bed in a sitting posture. Orthopnœa got more and more marked. Skiagram showed a mediastinal

shadow and the end came quite suddenly as she strained herself even so little.

*Case Report 43*—A young zemindar consulted for a sinus on his sternum. It proved to be a small necrosis. The skiagram however, showed a large mediastinal shadow. Syphilotherapy gave him a lease of life, though it was semi-invalid; eventually, years later he died from compensatory failure.

A thoracic x-ray shadow in a syphilitic may thus mean one of three conditions: (1) enlarged aorta (the aneurysm itself), (2) mediastinitis and (3) lymphadenitis.

In non-pulsating aneurysms an expansive pulsation may return as the result of treatment due to resolution of mediastinitis and periaortitis. Pain, which is either due to the direct effect of pressure of the aneurysm or mediastinitis and adhesions, is relieved while the pulsation is slowly returning. The administration of antisyphilitic remedies should be in carefully increasing doses in order to avoid therapeutic shock and vasoculotoxic effect of arsenicals. It is, therefore, desirable to commence with mercury and iodides and then go on to bismuth and arsenic.

Syphilis is a reputed predisposing factor in arteriosclerosis and of all causes of coronary stenosis, at least 14 per cent is due to latent syphilis. This has to be remembered in angina pectoris cases. In some cases of angina abdominis syphilotherapy gives much relief.

Thus these cases have to be investigated for the syphilitic element in it either alone or associated with other conditions such as strain, alcohol, toxæmias, coccal infection, diabetes, etc.

*Case Report 44*—A Marwari merchant, 58. History of glycosuria; several years' duration; had Kaviraji treatment only for it. History of treponemal infection and miscarriages. Developed gangrene of the toes of one foot. On examination: Marked arteriosclerosis and hypertension. Urinary and blood sugar persisting in spite of insulin. No pulsation from the tibials up to the popliteal artery. French Codex iodine in small doses helped pulsation to return and the formation of a line of demarcation. He insisted on going back to the Kaviraj and I was told that he died of diabetic coma and oliguria.

Early signs in late aortic disease are auscultative, accentuation of the second sound, bruit and conduction up towards the sternal notch and to the right. In the heart, one has to look for pericarditis, myocarditis and endocarditis with or without mediastinitis.

*Case Report 45*—A patient with severe precordial pain and much thoracic distress was referred from the O.P. department. Pulse quick, small, beats missing. Auscultation: Muffled beats feeble, friction; percussion, cardiac dullness increased. These, supported by quick x-ray screening indicated pericarditis with effusion. On paracentesis of the pericardial sac I drew some opaque fluid which gave him immediate relief. Later, skiagram revealed mediastinitis. The second attempt was a dry tap two days later. Though much was done to help the patient he could not even partially restore his compensation.

Of the smaller vessels syphilis affects mostly the circle of Willis and the lenticular arteries in the brain. Sclerosis of the peripheral vessels of the extremities may give rise to ischæmia, often resulting in chronic indolent ulcers and patchy gangrene. Occasionally it may simulate Raynaud's disease. I have seen a case of gangrene of the toe in an adult and multiple gangrene of all the fingers of one hand in a child. Both these improved considerably with antisyphilitic treatment which was adopted on the strength of positive serological reports.

Syphilitic phlebitis is not so common, but I have known several cases which, in the first instance, looked like filarial phlebitis and lymphangitis, but eventually proved to be of syphilitic origin. S.W.R. and therapeutic tests confirmed my conclusions.

*Case Report 46*—A zemindar from Bihar, 35. Used to get recurrent attacks of lymphangitis and phlebitis of the left cord and orchitis of the testicle, the phlebitis occasionally spreading to the legs. Filaria never detected in the blood, but on the strength of clinical findings antifilarial treatment was adopted and continued for two years. Arsenical injections caused much reaction. On examination: I noticed some pealing patches on both palms and the patient complained of persistent headaches. Suspecting syphilis, the blood was tested; S.W.R. 5/10. A course of arsenic (protected arsenoparitran) followed by bismuth brought the S.W.R. down to negative; the phlebitis subsided and did not recur for two years. The patient had the remains of a Neisserian infection which was treated at the same time.

The diagnosis of C.V.S., besides the routine examination of the heart and blood vessels, the S.W.R. and C.S.F. also need testing. It is interesting to note that while in uncomplicated cases of C.V.S., S.W.R. is positive in 70-85 per cent, those associated with N.S. (neurosyphilis), S.W.R. is negative. This necessitates routine neurological examination in all cases of C.V.S. with negative S.W.R. C.S.F. test is more often abnormal, 40 per cent in C.V.S. than in neurosyphilis 25 per cent. B.P. of both sides should be tested; a difference in the two sides very often suggests C.V.S. Skiagrams may be stereoscopic. Electrocardiograph with abnormal T-wave and Q.R.S. complex rouses suspicion. Cases of C.V.S. with N.S. cause complications in clinical signs and symptoms and laboratory tests and thus diagnosis and treatment become more difficult and prognosis naturally graver.

*Treatment of C. V. S.*—C.V.S. is a potent factor in causing morbidity and incapacity. Its dangers and probable disasters and the high mortality from it are indications for early and effective treatment. Unfortunately, the prognosis is not bright and treatment has to be extremely cautious to guard against reactions. A.B. (Arsenobenzol) should be avoided, particularly in early aortitis and aneurysms. Even N.A.B. by its toxicity progressively involves the myocardium in aortic syphilis, as it induces fibrosis and thus weakens the musculature. This is shown by ventricular tachycardia and ventricular fibrillation (T-wave and QRS. complex phenomena in cardiograph tracings). It is desirable to commence treatment with mercury, preferably

with inunctions; its abosrption is slow and its effects are noticed after three weeks of steady methodical rubbings. Then mercury can be given orally or parenterally with iodides. This is followed by bismuth therapy; its soluble salts are preferable than the unsoluble salts. Later N.A.B. when the condition is well under control; these should be commenced with very small doses and interim mercury and iodide medication will be useful. Sodium iodide has no special advantage as it is eventually converted into potassium salts in the tissues, but if intravenous injection of iodine is proposed in desperate cases, the sodium salt is preferable. French Codex iodine in small doses are often useful; large doses are liable to lower the blood pressure undesirably too quick. Entodon injections I have often found valuable. Intraspinal therapy I have seldom found of much use, but some recommend it. It is necessary to control treatment by fluoroscopy, skiagrams, cardiography and B.P. estimation at regular intervals during treatment, as these give indications of the rate and extent of absorption of pathological and inflammatory material and fibrous tissue and also indicate myocardial changes. Any relaxation may result in undesirable consequences, even disasters.

Here are a few illustrative cases:

*Case Report 47*—Mr. P. S., a zemindar member of the legal profession. Very old history of infection; was treated in this country and abroad. Main symptoms were those of hypertension, mental confusion and disinclination for exertion. Arsenobenzols used to produce marked therapeutic shocks, so was treated with mercury and iodides. S.W.R. still positive. I put him on injections of arsenic detoxicated by being organically combined with liver extract (arsenoparitran) and then with a similar bismuth preparation (bismoparitran). His B.P came down slowly and he felt mentally fitter, the tired feeling after exertion being considerably less. As he was very keen on further reduction of his B.P. I recommended small doses of iodides. Later, he induced his personal physician to further reduce his B.P. and rather biggish doses of some iodine preparation was given which he continued for a fairly long time. At a chance meeting this physician reported to me that the patient's blood pressure had come right down, even lower than his expectations. This I said was a warning. He went upcountry for a change and one morning he was found lying dead in his bed.

*Case Report 48*—Mr. D., a Parsi merchant, 60. Married in 1910. Had a small penile sore which his doctor diagnosed as non-specific. He placed himself under a Hakim. He had six issues of which only two were alive. Two miscarriages, one died of epilepsy and another of convulsions. Felt he was in good health for 26 years when he found a swelling in his neck. Consulted his doctor who found B.P. 200-100. S.W.R. 10/10. N.A.B. injection caused severe reaction, dyspnœa, cyanosis etc. Consults me then with his doctor with the report that the cervical swelling which was hard had become softer and pulsatile after the injection. I recommend a course of bismuth injections, iodides and mercury. B. P. remained the same and pressure symptoms continued. I then prescribed arsenoparitran, commencing with 1 c.c., gradually increasing to 3 c.c. as there were no reactions. B.P. came down to 175-95, distress less; swelling reduced to half its size. Entodon injections and French Codex iodine alternately with hydrarg inunctions. Further improvement. But he commenced to work as he could not afford to rest. The strain made him worse again. Resumed arsenoparitran, the swelling was further reduced, the distress got less, but B.P. kept up 180-100.

*Case Report 49*—Mr. S., Indian merchant, 55. Consulted me for hæmorrhoids. In course of examination I found his heart dilated and a marked aortic bruit extending up the sternal notch to the right. Reflexes disturbed. B.P. 220-160. I asked him not to mind his rectal condition much but to get his blood tested and his heart examined by electrocardiography, also x-ray examination of the chest The suggestion of S..W.R. was unpleasant to him and he forthwith approached a Kaviraj. In less than three weeks, one morning after a slight exertion he felt sick and giddy; dyspnœa set in, he got cyanosed and expired so suddenly that medical aid could hardly be rendered. Evidently, it was a case of aortitis, perhaps also coronary stenosis. I was told later that his wife had some miscarriages.

In the case of peripheral vessels, treatment naturally would be on the same lines. In a few of my cases of syphilitic arteriosclerosis with chronic ulcers and threatened gangrene I have obtained good results from periarterial sympathectomy.

Artificial fever therapy by electropyrexia or otherwise has been recommended by some, but I have not so far ventured to adopt this in C.V.S. cases. I have however, found it suitable in other types of latent syphilis, particularly in neurosyphilis.

VISCERAL AFFECTIONS IN LATE AND LATENT SYPHILIS: Visceral complaints in a latent syphilitic patient are not uncommon. Here, syphilis alone may account for it or it may be a contributing or predisposing factor. This would, therefore, be a suitable subject for general medicine or surgery. I shall thus refer only to some facts from my experience which are particularly interesting from syphilological considerations.

Gastric hypochlorhydria has seemed to me to be a peculiar feature of latent gastric syphilis. I find in American statistics 90 per cent in heredosyphilis and 60 per cent in acquired syphilis as late phenomena. There are the classical symptoms of gastric ulcer with this exception that hæmorrhage is less frequent. Opaque meal screenings and skiagrams indicate gastric ulcer; absence of hæmorrhage and serological evidences are negative factors.

*Case Report 50*—A case of clinically typical gastric ulcer confirmed by radiography, but no history of hæmatemesis.

A mill-hand 35. A sufferer from gastric pain and dyspepsia for years. No history of infection, heredity was not denied though not definitely traceable. I anastomosed stomach and jejunum by electrosurgical method.

Relief strikingly satisfactory. Six months later opaque meal escaped by a good stoma as disclosed by screening and films. Body weight remaining stationary, blood was tested but S.W.R. negative. Therapeutic test with arsenic some response. Arseno-bismuth therapy helped patient to gain weight and improve his general health. He is now a full-wage earner in a jute mill.

The neurological element in gastroduodenopancreatic syndrome with hepatic dysfunction and the possibilities of latent syphilitic factor in it has often interested me. It has sometimes been adventurous and illuminating. The jar specimens in various museums have had an inspiring influence and in many cases, pre and post-operative syphilotherapy has been as gratifying to me as to my patients.

Some cases of fibrosis of the pancreas of a miliary or gross character causing pancreatic or pancro-biliary dysfunction have improved remarkably under arseno- and bismo-paritran and I have wondered if the liver element in these preparations has had anything to do. In other cases while treating patients for other syphilitic conditions, their old digestive troubles have noticeably improved, admittedly proving syphilis to be partly responsible for these.

It has been said that the small gut is notably immune to the treponeme. I have seldom if ever seen gross organic lesions but a neurogenic factor of syphilitic origin there may have been. The museum specimens are not in all cases in support of this. The colon, particularly the lower segment, is prone to syphilitic granulomatous affections. These can be palpated in the left iliac fossa and visualised by endoscopes. Sometimes they extend to the mucocutaneous anal margin. I shall cite two cases:

*Case Report 51*—A middle-aged European with rectal obstruction by a mass of growth was admitted in my chief's ward when I was a house surgeon. Histological diagnosis: neoplasm, malignant, precancerous. A Kraske was performed. Wound would not heal and he went to a Convalescent Home. I lost sight of the case for 9 months as I was abroad on study leave. He paid me a surprise visit on my return and as I had seen the introduction of A. B. (Salvarsan) in Europe (1907), in my enthusiasm I gave him some injections with surprising results. A few more injections healed up the ulcer.

*Case Report 52*—A young photographer and artist was admitted in my ward for anorectal granuloma. Excision and cautery did not give satisfactory results and caused suspicions of malignant changes. I risked a course of N.A.B. which cured his condition and he resumed his artistic profession.

*The liver.* In the earlier parts of this paper I have made brief references to syphilitic hepatitis and I have dealt with tropical, amœbic and syphilitic hepatitis in my book on Tropical Surgery and Surgical Pathology. The silent, symptomless hepatic enlargement is often overlooked. Syphilis as a predisposing factor in the so-called tropical hepatitis and amœbic hepatitis has been my constant consideration. In many cases of hepatitis, S.W.R. is positive but I am not convinced that the treponeme accounts for it. This has been a matter for much speculation.

Late and Latent Neurosyphilis: Latent manifestations of syphilitic involvement of the nervous system has been here and there referred to in previous pages of this discourse. The involvement may be meningeal, meningovascular or parenchymatous or an overflow from one element to another. It is said that 65 per cent of all neurological material at autopsies is neurosyphilitic and of all cases of syphilis 65 to 70 per cent have neurological elements in it.

Syphilis accounts for a large percentage of mental cases of which 93 per cent are G.P.I., 45 per cent maniac types, 30 per cent psychotic, and 25 per cent are paretic tabes.

In a comparative study of theca and cisterna punctures of several cases I have found some interesting differences.

I propose to postpone the study of neurosyphilis in general and those relating to urogenital involvement in latency to a future communication.

## References


Bertilli, E.—Ref. Stoke's Modern Clinical Syphilology, p. 871, 1935.

Brown, W. H.—*Trans. Eighth Intern. Congress Dermat. & Syph.*, Copenhagen, p. 220, 1930.

Brown, W. H. and Pearce, L—*Am. J. Syph.*, **5**:1, 1929.

Chatterji, K. K.—Tropical Surgery and Surgical Pathology, John Bale, Sons and Danielson Ltd., London, 1927.

Chesny, A. M.—*Medicine*, **5**:459, 1926.

Evans. G.—*Brit. M. J.*, **2**: Sept. 9, 1933.

*Idem*—Essays on Chronic and Familial Syphilis. Ch. II, 1934.

Gerogi, F.—*Ztschr. f. Immunitätsforsch. u. exper. Therap.*, **37**:285, 1923.

Harrison, L. W.—Diagnosis and Treatment of Venereal Diseases in General Practice, Fourth Edition, p. 257, 1931.

*Idem*—Medical Annual, John Wright, Bristol, p. 463, 1923.

Jeanselme, E.—Ref. Stoke's Modern Clinical Syphilology, p. 876, 1935.

Langer, E.—*Munch. med. Wchnschr.*, **73**:1782, 1926.

Levaditi, C. and Marie, A.—*Ann. Inst. Pasteur*, **21**:138, 1907.

Levaditi, C. and others—*Compt. rend. Soc. de biol.*, **115**:491, 1934.

Lutz, A.—Rudolph Voichow Krankerhaus (Collection)

Neisser, A.—Bietrage zur Pathologic and Therapic Dur Syphilis. J. Springer, Berlin, 1911.

Noguchi, H.—*J. Exper. Med.*, **15**:20, 1912.

Warthin, A. S.—*Am. J. Med. Sc.*, **152**:508, 1916.

*Idem—Atlantic J. Med.*, 1927 Aug.

*Idem—Brit. M. J.*, **2**:236, 1929.

Warthin, A. S. and Olsen, R. E.—The Granular Transformation of Spirochæta Pallida in Aortic Focal Lesions.

# THE TITRATED POSITIVE CONTROLS IN THE WASSERMANN REACTION

S. D. S. GREVAL, Lieut.-Colonel, I.M.S.

*Imperial Serologist's Laboratory, School of Tropical Medicine, Calcutta.*

### The Usual Positive Control

This is put up from a positive serum left over from the last test. Sometimes the serum is preserved more or less carefully for a long period. It is diluted 1 in 5 in the usual way, like the sera under test. Generally its anticomplementary titre rises considerably with keeping and interferes with the reaction.

While some positive sera give a positive reaction when diluted 1 in 200, others react in the usual 1 in 5 dilution only. A dilution of 1 in 5 from the former is really no control at all of any of the reagents concerned in the reaction, unless the reagent has failed utterly. *Of the day to day variations it cannot give any indication whatsoever.* Such variations always occur.

### The Titrated Positive Controls

The writer introduced these controls in his laboratory five years ago (Greval, Das & Sengupta, 1938). They have worked satisfactorily ever since. This is how they are prepared: The positive sera which have given full inhibition of hæmolysis with the two doses of the complement in accordance with method No. 4 of the (British) Medical Research Committee (now Council, 1918) are put up with 4 MHD of complement and uncholesterinised antigen. Some of them will give full inhibition of hæmolysis again. They are +++ (strongly positive) sera. A minimum of 6 and maximum of 25 of such sera is pooled, filtered through Seitz filter, diluted 1 in 5 with 0·25 per cent phenolised saline and stored in a bottle containing beads, in a refrigerator. The titre is determined, on the day of pooling and a month later, in dilutions of 1 in 25, 1 in 50, 1 in 100 and 1 in 200 with 3 and 5 MHD of the complement.

The following is a typical initial reaction:—

| *Dilution* | *3 MHD* | *5 MHD* |
|---|---|---|
| 1 in 200 | T (=trace of hæmolysis) | ± |
| 1 in 100 | + | T |
| 1 in 50 | + | + |
| 1 in 25 | + | + |

The reaction usually falls somewhat during the first month of keeping. Afterwards it remains constant indefinitely with a constant antigen and with a complement of optimal titre and optimal reaction with cholesterol (*vide infra*). Two selected dilutions, one twice as strong as the other, representing the end-points of complement fixation, are made from it and put up with the sera under test on every day of the work.

### Three Uses of the Titrated Controls

1. *Selection and correction of the antigen*—In their fixation with a constant serum several antigens of the same type may differ amongst themselves more than the several types do. A selection must be made to obtain a standard antigen (Greval, Chandra & Das, 1939). A concentration is also possible. A titrated control, a one in ten dilution, provides the constant serum. The uncholesterinised antigen of method No.4 must fix the complement with the control.

2. *Adjustment of the antigen-complement system for the various types of the complement*—The writer found six attributes of the complement affecting the fixation significantly with a constant serum and antigen (Greval, Chandra & Das, 1940). The titrated controls provide the constant serum.

The six attributes are: (*i*) optimal titre (1 in 40, 1 in 50 and 1 in 60, according to the titration after method No. 4 of the MRC), (*ii*) high titre (1 in 70 and above), (*iii*) low titre (1 in 30 and below), (*iv*) optimal reaction with cholesterol (when the tubes in the two rows of the titration correspond), (*v*) cholesterol-shyness (when the row with the antigen lags) and (*vi*) cholesterol-fastness (when the row without the antigen lags).

The antigen-complement system can be so adjusted for the various types of the complement as to give constant reaction with the titrated controls.

3. *Measurement of the significance of daily variations in the reaction*—The reactions of the two selected dilutions put up on each day of work measure the variations, thus:—

| | *I Control with 3 MHD complement & standard antigen.* | | *II Control with 5 MHD complement & standard antigen.* | | *Remarks on reaction and necessary action.* |
|---|---|---|---|---|---|
| | I, 1. Dilution 1 in 50 | I, 2. Dilution 1 in 100 | II, 1. Dilution 1 in 50 | II, 2. Dilution 1 in 100 | |
| Reaction should be: | + | T | +/T | T/± | The usual reaction. |
| It may be: .. | + | + | + | T | Slight overfixation, of no significance in the routine. |
| | + | ± | T | ± | Slight underfixation, of no significance in the routine. |
| If it is: .. | + | + | + | + | Excessive overfixation. Accept negatives in the test but repeat positives & doubtfuls. |
| If it is: .. | T | ± | ± | − | Excessive underfixation. Accept positives in the test but repeat negatives & doubtfuls. |

The selected dilutions may be 1 in 100 and 1 in 200 or 1 in 25 and 1 in 50, or other suitable strengths such as 1 in 40 and 1 in 80. The rising anticomplementary titre does not affect any one of them except the 1 in 25 dilution occasionally. The usual selected dilutions are 1 in 50 and 1 in 100, when 25 sera have been pooled.

It will be observed that fixation in the control II, 1 is slightly more than in the control I, 2.

Similar controls are put up with other antigens when more than one antigens are used in the reaction. The writer uses four antigens.

Daily and seasonal variations in the complement-fixation are largely due to the corresponding variations in the complement of the guineaping serum. Unless they are detected and the necessary adjustments in the procedure made, the reactions of some borderline cases are bound to be reported wrongly everyday.

True variations in the reactions of the human subject themselves, due to meteorological causes, are also known (Hoverson, Petersen & Sackett, 1935). In the writer's experience they play a minor part in the wrong or contradictory reports, in comparison with the variations of the previous paragraph.

SUMMARY

1. The usual positive control in Wassermann reaction is a very poor control indeed.

2. Titrated positive controls made from specially selected and pooled strongly positive sera give constant reactions indefinitely.

3. Selection or correction of the antigen, adjustment of the antigen-complement system for the different types of the complement and measurement of the significance of the daily variation in the complement fixation can only be made by means of the titrated positive controls.

REFERENCES

GREVAL, S. D. S., DAS, B. C. AND SENGUPTA, P. C.—*Indian J. M. Research,* **26**:393, 1938.

GREVAL, S. D. S., CHANDRA, S. N. AND DAS, B. C.—*Ibid.,* **27**:589, 1939.

*Idem—Ibid,* **28**:257, 1940.

HOVERSON, E. T., PETERSEN, W. R. AND SACKETT, D. L.—*J. Lab. & Clin. Med.,* **20**:337, 1935.

MEDICAL RESEARCH COMMITTEE (now COUNCIL)—'The Wassermann test'. Special Report Series No. 14. His Majesty's Stationery Office, London, 1918.

## AN APPEAL

The following appeal has been issued by Dr. P. Veeraiah Chowdury, L.M. & S., President of the Andhra Provincial Branch, Indian Medical Association:

"Cholera, malaria, dysentery and a host of other diseases consequent upon starvation and malnutrition have broken out in famine-stricken Bengal in an epidemic form. During October, deaths from cholera alone averaged 5349 per week. The disability to work and the resulting economic loss to the community from malaria are enormous. There is a huge inadequacy of medical facilities to combat the situation. The most pressing problem of famine-stricken Bengal at the present moment is medical relief, as Major-General Stuart remarked in his recent broadcast speech. In our province too, Royalesma is suffering from a severe famine.

At the recent Andra Medical Conference, medical men felt that they should do their bit to relieve the distress, particularly, in the direction of medical relief. At their instance, the Royalesma Famine Relief & Assam and Bengal Medical Relief Committee was formed with the undersigned as President, and Drs. S. Mallikharjuna Rao of Guntur and P. V. Ramachandra Reddi of Nellore as members, with powers to co-opt. The last mentioned gentleman toured Bengal and brought harrowing tales of woe prevailing there.

This is no time for a lengthy appeal. Relief, mainly medical, must be rushed to the affected parts. I request my medical brethren, the public, drug companies and industrialists to send their generous contribution, in both kind and coin, to the undersigned.

*Guntur*
*2-12-43*

P. VEERAIAH CHOWDHURY,
*President, Andhra Provincial Branch, I.M.A.*

***MEDICAL PREPAREDNESS SERIES***

*The war coming on to the borders of India has revealed to us all the terrible aspects of the menace and it has become apparent that the profession shall have to take up quite a large share of responsibility in A.R.P. measures. A series of articles on war medicine, A.R.P. and allied subjects is being published with the idea of helping the cause of necessary medical education. This is the ninth article of the series.*—EDITOR, *J. Indian M. A.*

# HIGH ALTITUDE FLYING

B. P. NEOGY, M.B., M.R.C.S. (ENG.), M.R.C.P. (LOND.),
*Calcutta*

## INTRODUCTION

The new feature of the present World War II is aerial warfare. In the World War I it was developed towards the end but the range and bomb-carrying capacity were not so highly developed. The climbing did not reach much above 16,000 ft. and most of the flying was done at low altitude. To-day the planes have got to go high above and higher still because of the accuracy and firing power of anti-aircraft guns. Sometimes planes do escape a battery of the anti-aircraft guns by flying very low, as at that height the guns are ineffective. The strategy of destroying the armament production and civilian morale in the present war, has forced to jack up the ceiling to a higher altitude. Some anti-aircraft guns have been developed, which can, it is believed, fire continuously and automatically aimed by shortwave radio-plane-locators (Radar or magic eye), at a height of about 35,000 ft. So the problem has been to build planes which could fly higher still. The allies have been successful in producing long range heavy bombers and planes which can soar higher and bomb enemy cities. But the main difficulty has been with the man behind the machine. Can a human being live and sustain his life at that height? Man is dependant on good rich air for life. The classical description of the perils of high altitude flying is given by the famous French meteorologist, Tissandier. With two companions Tissandier made a balloon ascension. They had oxygen but feeling fine they forgot to use it. The companions died. He wrote "I now come to the fateful moments when we were overcome by the terrible action of reduced pressure. At 22,900 ft. torpor had seized me. I wrote, nevertheless, though I have no clear recollection of writing. At 24,600 ft., torpor that overcomes one, is extraordinary. But there is no suffering or thought of danger. On the contrary one feels inward jby; one rises and is glad to be rising. At 26,000 ft. I felt so weak I could not even turn my head to look at my companions. I wished to call out but by tongue was paralysed. All at once I fell down powerless and lost all further memory."

## RATE OF CLIMB—ALTITUDE OF FIGHTING PHYSIOLOGY AND SYMPTOMATOLOGY

The rate of climb varies with the type of machine. The rates of descent and ascent are more in case of dive bombers and fighters. On an average the rate of climbing varies between 2,000-5,000 ft. per minute. This detail is important as will be seen from discussions later on. As has been already pointed out that during the World War I, flying and fighting usually took place at an altitude of 16,000 ft. or less. Aerial fight was only developed towards the end. During that time the aviator could obtain oxygen from his surrounding air in enough quantities to carry on. Inspite of this the routine use of oxygen was followed thus (Grant, 1942):

(*a*) All flights of 10,000 ft. over 1 hour's duration.
(*b*) All flights of 15,000 ft. regardless of duration.
(*c*) From ground up when the rate of climb is 2,000 ft. per minute.
(*d*) Night from ground up.

In the present war ordinary flying height has gone up between 15,000 ft. to 30,000 ft. In active work, *i.e.*, fighting and bombing operations the ceiling is much higher. Inhalation of pure oxygen has been necessary even in ordinary flights. Why oxygen is required in a flight?

Although the composition of the atmosphere below the stratosphere, *i.e.*, approx. 70,000 ft., is uniform, air is compressible. The following is the composition of air:—

| | | |
|---|---|---|
| Oxygen .. .. .. | by volume | 21 |
| Nitrogen .. .. .. | „ | 78 |
| Rare inert gas .. .. | „ | 1 |
| | | 100 |

The air is denser at lower than higher levels. The pressure of the gas consequently decreases as we go up. The decrease in pressure is greater near the ground than higher up. This is important because oxygen saturation of the blood depends on the partial pressure of the gas. Partial pressure, in a mixture of gases, is the pressure exerted by any one gas in the mixture. Oxygen being 1/5 of the total volume, it exerts 152 mm. pressure at ground level. Here this pressure is sufficient to saturate the blood leaving the lungs. Between 15,000 to 18,000 ft. the atmospheric pressure has fallen to 428 mm. and the oxygen partial pressure in the lungs to approximately 50 mm. Hg. With this pressure the blood can only be 75 per cent saturated . In quick climbing the body cannot always adjust itself to the rapid decrease in pressure and also in heights between 15,000 ft. to 18,000 ft., when the oxygen partial pressure has fallen less than 1/3rd than at ground level, there is definite oxygen lack in the tissues. From these considerations the above rules for oxygen inhalation were made for aviators. Lack of oxygen affects every part of the body. There may not be any immediate effects but in time the anoxia leads to inefficiency, discomfort and fatigue. This may greatly jeopardise the mission of the pilot. The symptoms which arise due to prolonged stay affect the different organs.

*Brain*—Tissandier's description shows the symptoms clearly. Diminution of alertness, inaccuracy, lack of self control, self-confidence and appreciation of time are followed by gradual slowing down of all mental processes. Unconsciousness sets in even without the knowledge of the person.

*Vision—By day* the acuity of vision is diminished and the light appears dimmed. *By night* oxygen supply is more necessary

than during the day. Slight degree of oxygen lack at 4,500 ft. impairs the adaptability of the eye to dim lights and to recognise dimly illuminated objects. Night flying has been considerably developed during the past 4 or 5 years. The whole blitz over London was carried out from dusk to dawn. Night attacks prevent the planes from being seen. This diminishes the effectiveness of the guns in the absence of search lights or radio locators. Vitamin A is used in medicine as a treatment of *night blindness*. On this assumption pilots, who take part in night operations, are given a liberal supply of food containing vitamin A and even tablets of vitamin A, to increase their night vision in addition to the usual oxygen supply.

"Black outs"—This occurs when an aircraft is flying along the arc of a circle in the course of fighter acrobatics. Due to action of centrifugal acceleration acting from the centre of the circle, the weight of the pilot increases several times with consequent fall in blood pressure in the large vessels supplying the brain and the eyes. When this reaches a given volume, failure of vision occurs which is called "black outs". It is not possible here to discuss the detailed physiological mechanisms which give rise to "black outs".

*Variations of Temperature*—Lack of oxygen is also responsible for the feeling of cold in the extremities. With oxygen warmth appears in a few minutes. But this is not all. The temperature at higher altitude is low. To fight cold is one of the most stubborn problems of high altitude flying. At 20,000 ft. it is 12°·3 below zero and at 30,000 ft., 48° below zero. The pilots should naturally be dressed in heavy suits and gloves. It is presumed that this diminishes the efficiency of pilots to 20% of normal and at 40° below zero to only 13% of normal. At this painfully low temperature there is marked mental depression, indifference to mission and even to his own life. Moreover, frosting of the windows, leaves the pilot blind. No system of heating of planes has yet been found successful. Heavy dresses can keep the pilot comfortable upto zero degree. An electrically heated suit is satisfactory at all altitudes but it consumes power. Heated suits have been used to some extent in Europe and America with satisfaction.

The War being shifted to deserts and tropical climates, has given rise to fresh difficulties. In daylight high altitude flying the pilot may suffer from severe sun-burn. The intensity of ultraviolet rays at high altitudes is triple and quadruple than at sea level. The blazing heat of tropical regions is also responsible for this difficulty. Researches are being carried and are now to some extent successful in finding a glass (trade name golden plate) which not only provides almost perfect light transmission in cabin ceilings but also strains out all but 0·4% of the ultraviolet in the sun's rays. An infra-red resistant glass also cuts most of the heat from sunlight.

### Compression and Decompression Effects

It has already been pointed out that air pressure decreases on ascent and increases on descent from high altitude. The decreased pressure even upto 3 pounds per square inch at 40,000 ft. (14·7 pounds per square inch at sea level), has no apparent effect on the protoplasm. But gases dissolved in the tissues and present in the upper respiratory tract, the middle ear and intestines, are subjected to this variation in pressure. These gaseous disturbances may give rise to various symptoms.

*Abdominal gas*—As the air pressure decreases outside, there is accompanying expansion of gas in the stomach and intestines. If the gas is sufficient in quantity, it may give rise to abdominal pain and prevent further ascent. The abdominal gas is the residual nitrogen of swallowed air. So pilots should avoid any practice *e.g.*, chewing gum, *pan*, which increases salivation and swallowing.

*Nasal sinuses*—The same happens in case of nasal sinuses, If the opening into the sinus is free, equilibrium of external and internal air pressure is maintained. Any infection or mucous secretion blocking the outward passage of the inside air, will produce increased pressure inside relative to the outside. This difference in pressure elicits pain.

*Aero-otitis media*—The air in the auditory tubes and mastoid air cells, is in communication with the external air through the internal opening in the nasopharynx. If infective secretion blocks the opening the same difference of pressue ensues. The effect is more marked during descent than in ascent. The pressure outside is increased above that in the aural spaces. Many must have experienced slight temporary deafness while coming down from the hills in a car. In case of descents from high altitude the difference in pressure is more marked so as to produce congestion, oedema and even hæmorrhage. The hearing may be impaired temporarily but complete auditory function is restored with treatment.

Another cause of this type of otitis media, is the inhalation of oxygen during descent. The oxygen replaces the gas inside the ear and during the next 24 hours this oxygen is replaced by nitrogen of the outside air with opening of the auditory tubes in the acts of swallowing. If the pilot goes to sleep immediately, the acts of swallowing are suspended and oxygen inside the tubes is absorbed leading to a cupping action on the middle ear. This can be prevented by breathing air below the level of 15,000 ft. during descent.

*Aero-embolism*—Aero-embolism is one of the most serious accidents of high altitude flying. The course of events is the same as in Caisson's disease. In other words this may be termed flier's Caisson disease. When air is breathed, oxygen is absorbed in the blood and following the law of the partial pressure all other gases pass in solution in the fluid plasma proportionally. The nitrogen in the plasma remains in solution because there is equilibrium between external and internal pressure. During ascent there is fall of pressure in the outside air and nitrogen comes out of the blood in bubble formation. If the ascent is slow there is time for the nitrogen to diffuse through the lungs. But in case of rapid ascents to great heights, the nitrogen comes out of the blood and forms bubbles in the vessels and tissues causing tearing of tissues and embolism in vessels. The gas pressures in the capillaries and venous blood contributing to aero-embolism are:—

| | | |
|---|---|---|
| Nitrogen | .. .. | 573 mm. |
| Carbon dioxide | .. | 47 mm. |
| Water vapour | .. .. | 47 mm. |
| Oxygen | .. .. | 40 mm. (variable) |
| | | 707 mm. |

As long as the external pressure is 707 mm., the gases remain in solution. When the pressure falls below 707 mm., bubble formation is expected. It has been found that symptoms of aero-embolism occur when an ascent is made to about 30,000 ft. or more at the rate of climb of modern aircraft. Clinically, aero-embolism is manifested in three forms:—

(1) "Bends"—It is a term used to denote the feeling of pain in the extremities usually in the area of the joints. The pain is shifting and aching in nature. It is caused by bubble formation in nerve trunks, tendon sheaths and joint spaces. Others think it to be due to the result of embolic ischæmia of osseous tissue.

(2) Asphyxia or chokes—These attacks of asphyxia are due to widespread embolism in the pulmonary vessels.

(3) Paralysis—This is brought about by embolism in the central nervous system specially the spinal cord.

Happily asphyxia and paralysis are not so common as the "bends". As will be apparent from the pressure of the gases in the capillaries and veins, nitrogen is the principal cause of aero-embolism. Nitrogen can be easily eliminated from the plasma by simple oxygen inhalation. If the nitrogen can be maintained at a sufficiently low pressure at the ground level, bubble formation can be eliminated irrespective of the rapidity of ascent. With this idea a series of experiments were carried out by Behnke (1942). The pressure alteration in altitude ascent was simulated in the laboratory by means of a steel chamber. Arrangements were made for preliminary oxygen inhalation and variations in barometric pressure. Through a window in the steel chamber the effects could be seen on the subject. Not only the problem of aero-embolism was investigated but important subjects such as fatigue, capacity of work, fitness, and cardio-vascular response were studied at various simulated heights. In all the experiments the rates of simulated ascent and descent were maintained constant at 5,000 ft. per minute.

*Long exposure experiments:—*

(a) Column I—Altitude attainable without previous oxygen inhalation and favourable to prolonged stay.

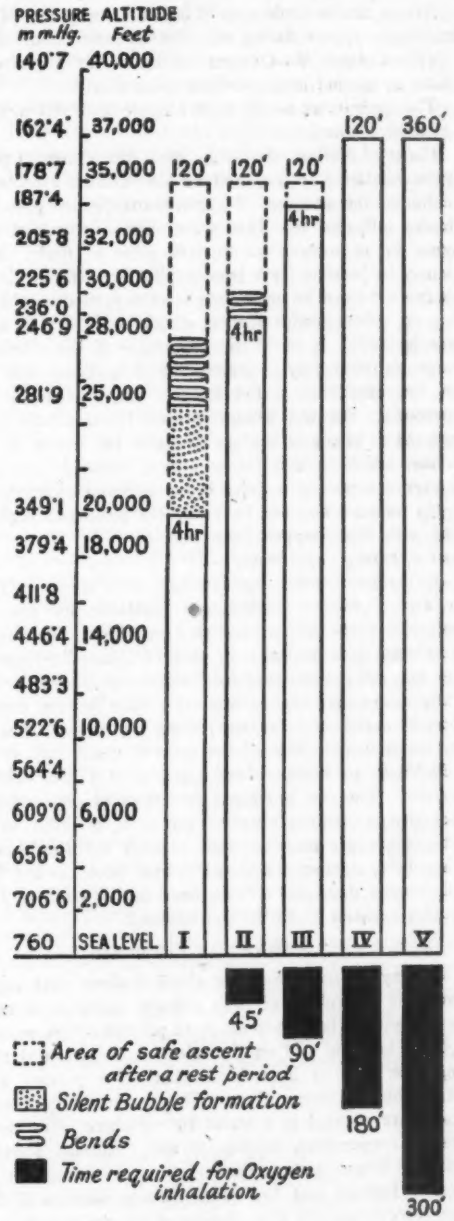
Ascents can be made upto 20,000 ft. without any symptoms for a stay of 4 hours. After this period the height may be increased to 35,000 ft. safely for a stay of 2 hours. Ascents between 20,000 ft. to 25,000 ft. are attended by fatigue developing after return to ground level, so this level has been called the area of silent bubble formation. 'Bends' appear when ascent is made straight between 25,000 to 28,000 ft. for a stay of 4 hours or when the altitude is subsequently raised to 35,000 ft. The symptoms are, however, mild.

(*b*) Column II—Oxygen inhalation for a period of 45 minutes at ground level followed by ascent.

The ascent can be made from 20,000 ft. to 30,000 ft. for a stay of 4 hours and subsequently the altitude may be increased to 35,000 ft. for a stay of 2 hours.

(*c*) Column III—Oxygen inhalation for a period of 90 minutes at ground level followed by ascent.

This permits an ascent to an altitude of 34,000 ft. for a stay of 4 hours followed by a further ascent to 35,000 ft. for a duration of 2 hours. It has also been found that a symptom-free ascent can be made to higher levels with oxygen inhalation for 90 minutes at ground level than with oxygen inhalation for the same duration in two periods of 45 minutes each at 20,000 ft and 25,000 ft.




DECOMPRESSION CHART FOR THE PREVENTION OF AERO-EMBOLISM (AFTER BEHNKE)

*N.B.*—Bends and silent bubbles appear when the *marked height is reached without any rest.*

(*d*) Column IV—Oxygen inhalation for a period of 180 minutes at ground level followed by an ascent.

Ascent can be made upto 37,000 ft. for a period of 2 hours. 'Bends' may appear during the third or fourth hour of stay.

(*e*) Column V—Oxygen inhalation for a period of 300 minutes at ground level followed by an ascent.

This permits an ascent to an altitude of 37,000 ft. for a stay of at least 6 hours.

*Value of Helium*—It can be seen that prolonged periods of oxygen inhalation are required for high altitude ascents in order to eliminate the nitrogen. Oxygen is toxic in the pure state and is highly inflammable. This is the main drawback of the pilots staying in an oxygen atmosphere prior to flight. Moreover this may be possible for a bomber pilot but a fighter intercepter pilot can not waste so much time in an oxygen atmosphere before going up, unless groups of them remain ready in such an atmosphere by turn. It has been found that if the elimination of nitrogen is effected by an atmosphere of oxygen-helium mixture, then the inhalation period of pure oxygen can be reduced enormously. Because helium is only 1/3rd soluble in fat as compared to nitrogen, the gas available for 'bends' in the bone marrow, which is 90% fat, is greatly reduced. So the pilots can carry on normal activity in conditioning rooms of helium-oxygen mixture and can be ready for prolonged high altitude flight with little oxygen inhalation.

*Short exposure experiments*:—

Experiments were also carried out to see how far a pilot can ascend without preliminary inhalation of any gas for eliminating tissue nitrogen and stay for 1 hour. This experiment is important from the point of view of fighter intercepter pilots. They may not get any time for preliminary oxygen inhalation or arrangements may not be made for such oxygen conditioning rooms in aerodromes far away from big towns. It was found that approximately half of the subjects could stay at altitudes of 34,000 ft. to 40,000 ft. for a period of 1 hour without any symptom. The rest developed symptoms of aero-embolism. It looks that a distinct personal factor is involved in ascents. Some people are more tolerant to high altitudes than others. It has been suggested that all fighter pilots should be tested to determine their *altitude tolerance* for a period of 1 hour at altitudes between 30,000 ft. and 40,000 ft.

## Selection of Personnel

It may be seen from the above findings that science has solved the difficulties of high altitude flying to some extent. The present warfare demands more prompt action, so, gradually emphasis is being laid on the selection of personnel than anything else. It has been found that some persons are more altitude-tolerant than others. This is necessary because the persons are encased in a sealed turret where vibrations, variations of temperature, inadequate rest, continual alertness and periods of intense activity demand a heavy strain on the nervous system. Persons with low grade chronic infection of the upper respiratory tract are also eliminated by the pressure test. It must be understood that *every one should not fly*. An analysis of Great Britain's flying casualties during the first two and one-half years' conflict, showed that of one hundred air fatalities only two were killed by the enemy, eight deaths resulted from defects in the plane and ninety were due to deficiencies in the individual, either physical or mental (Grant, *loc. cit.*). So the problem of personnel is an essential consideration in all flying. Selection should be made for training who are most free from real or potential, physical, psychological and mental abnormalities. Physical fitness to combat the stresses of flying is not the only requisite. Stability of mental and nervous organisation is equally important. Physical standards of pilots naturally vary. It is known that some men with physical handicaps such as having one leg, one eye, even tuberculosis or other deficiencies have made excellent pilots. Other considerations in the selection of pilots are age, intelligence, learning, memory, adaptability, attention, emotion and reaction time. These investigations are necessary because aviation is a complex task. It contains the fineness of an art and the exactness of a science. From a military standpoint it should be performed with the highest degree of efficiency. In active service there are only two classes of fighter pilots—the quick and the 'dead'.

## Future Air War

Progress is being made to fly higher still in altitudes above 7-8 mile zone. Flying fortresses and Liberators have already a ceiling of 35,000 ft., an altitude much higher than Heinkel-177. With oxygen mask it is possible to attain operational ceiling of 38,000 ft. but above this breathing even 100 per cent pure oxygen will not prevent a relatively quick and fatal loss of consciousness. This is because exterior body pressures have dropped so low that the lungs would baloon fatally if the oxygen were forced into the masks under pressure and without pressure oxygen dribbles into the lungs in insufficient quantities to maintain life. So the new fighters and super bombers will be equipped with *pressure cabins* to maintain internal pressure comparable to that of 20,000 ft. It is conceivable and even probable that they will boast a ceiling of over 50,000 ft. or 10 miles above the earth.

## Concluding Remarks

The amount of literature on aviation medicine is already vast. New problems are being daily faced by the medical profession all over the world. Great advance has been made during the four years of War. After a long time it has been felt necessary to open classes in the Indian Universities to teach aeronautics and allied subjects. It is hoped that along with it Aviation Medicine should be included in the curriculum of medical teaching in this country.

The medical men in the army have greatly reduced the incidence of diseases like typhoid, cholera, small pox, tetanus, even streptococcal and gas bacillus infection. In aviation, preventive medicine is so essential that its importance should not be overlooked. In this elementary communication an attempt has been made to emphasise this. When one calculates the time and money spent on the training of a pilot in whose hands the lives of others *e.g.*, passengers, gunners, bombardiers, observers etc. are dependant, not to speak of the lakhs of rupees worth bombers or fighters, the necessity of preventive medicine is viewed in the proper perspective.

## References

Grant, David N. W., Colonel—*Military Surgeon*, **90**:281, 1942.
Behnke Jr. Albert, R., Lt. Commander—*Ibid.*, **90**:14, 1942.

# CASE NOTE

## SPONTANEOUS INTRAPERITONEAL RUPTURE OF THE BLADDER IN ASSOCIATION WITH DISPLACED GRAVID UTERUS*

A. N. SARKAR, M.R.C.O.G.

*Lecturer in Obstetrics & Gynæcology, Medical College, Patna.*

Cases of rupture of the bladder have been rare in our hospital. As far as I know, during the last 18 years, only two cases were treated and that too, curiously enough within the last six months. The condition is grave enough to preclude the possiblility of such cases having escaped notice in the past. Eden and Holland (1937)) and Williams (1923) reproduce in their text books of midwifery pictures of ruptured bladder caused by retroverted and incarcerated gravid uterus. But the tear here is extraperitoneal and no detailed pathological reports are given. In his Operative Obstetrics, Munro Kerr (1937) gives reference of nearly a hundred cases of ruptured bladder in the literature and mentions that he has personally seen only two cases. Three cases of intraperitoneal rupture of the bladder are briefly described in The Abnormal in Obstetrics Berkley, Bonney & MacLeod, 1938). Claye (1941) from Leeds gives a very detailed report of a case of ruptured bladder in *J. Obst. & Gynæc. Brit Emp.* Here the tears were multiple and incomplete and occurred postpartum. He is of opinion that probably the patient would have been saved if diagnosis could be made and proper treatment adopted within 24 hours. Hamilton Bailey, as quoted by Beresford-Jones (1941), also is of the opinion that the majority of the cases end fatally unless operated within 24 hours.

I hope you will be able to throw more light on the subject from your personal experience. In fact it was this idea that prompted me to report these two cases.

### Case 1

Mosstt. Purakhia, H., aged 35 years was brought to the Hospital for Women in the evening of 5-10-42 for the treatment of increasing abdominal enlargement and pain. This was going on for about a fortnight, but during the last two days there was marked increase of the symptoms. She was of average build, and fairly well-nourished. Of her three pregnancies, first two were normal; the last was an abortion at the third month, 2 years ago. She gave a history of five months amenorrhœa, but was not sure whether she was pregnant. Previous menstrual history was normal. At the time of admission her pulse was 114 per minute, respiration 40 per minute, temperature 97°F. and yet she only complained of a feeling of exhaustion which she ascribed to the tiring journey across the river. She did not complain of any pain whatsoever, though definitely questioned about it. The abdomen was markedly distended, tympanitic in the centre and dull in the flanks and below. Fluid thrill and shifting dullness were well-marked. The lower part of the abdomen, the vulva and the lower limbs showed well-marked œdema. There was no history of any sudden acute pain suggesting rupture of any intra-abdominal viscus preceding the acute abdominal enlargement. In the suprapubic region, a lump rising to a hand's breadth above the symphysis could be made out though obscured by the œdema and tenderness. A catheter drew about an ounce of smoky urine; there was no foul smell about it. There was no doubt that the abdominal enlargemen was due to accumulation of free fluid. Internal examination revealed a retroverted gravid uterus, but the presence of free fluid in such enormous quantity baffled a correct diagnosis. The case was so unlike anything we had seen before or could imagine that we were easily taken in and only next morning was a provisional diagnosis of ruptured bladder arrived at.

On opening the abdomen several pints of slightly turbid fluid are found and drained off slowly. The bladder which formed the suprapubic swelling previously felt per abdomen now came into view. The peritoneal surface looked purple and nodular and the whole organ felt quite firm to the touch. On careful search a tiny pinhole opening was discovered through which urine was seen trickling out freely. This was closed by a purse-string suture which was buried with a second layer. The uterus was found impacted in the pelvis and was lifted up with some difficulty. The abdomen was then closed leaving a drainage tube, after mopping out as much of the fluid as possible. A catheter was passed and stitched in position.

Samples of fluid from the abdomen and urine from the bladder were collected for estimation of urea.

The patient died next morning. The abdomen was opened post mortem and the bladder was removed for examination. The mucosa of the bladder appeared congested and sloughy at the site of the tear; elsewhere it looked almost normal.

Histological examination by the Department of Pathology revealed signs of inflammation only.

Urea content of the peritoneal fluid was 0·8 per cent and that of the urine from the bladder 2·1 per cent.

When the abdomen was opened and the actual condition detected I felt rather foolish that I could not make the diagnosis straight away, but, as already stated, the case was so unlike anything I had seen before or could imagine that I was deceived, and before deciding on an operation, only a tentative diagnosis could be made. There was the woman with the abdomen enormously distended with fluid, with œdema of the lower limbs, vulva and lower part of the abdominal wall, acutely dyspnœic and yet without much complaint. Everything from heart failure to ruptured ectopic pregnancy was thought of and rejected and only a provisional diagnosis of ruptured bladder made.

### Case 2

Ram Piyari, H., aged 35 years was in extreme distress; unable even to get up when she was brought to the Hospital for Women in the afternoon of 13-4-43. General condition low, pulse 132 per minute, temperature subnormal, abdomen distended, resonant above, dull in the flanks, shifting dullness present. A soft catheter drew 6 ounces of blood-stained urine. She had one normal delivery 5 years ago. She was 4 months pregnant. With the memory of the first case still fairly fresh in my mind, I thought of ruptured bladder at once,

* Read at the Scientific Section of the XIX All-India Medical Conference, Patna, April, 1943.

but repeated questioning failed to elicit any history of urinary trouble. She said, she never had my difficulty in passing urine, only since pain began four days ago she had been taking less water and so had been passing smaller quantities of urine. There was no bleeding per vaginum. Examination per rectum revealed an old complete perineal tear and a very low cervix reaching to within one inch of the outlet. It was a case of prolapsed gravid uterus. In the lateral position it could be easily pushed up with the finger in the rectum but was again pushed down by the distended guts.

Though the presence of free fluid in the abdomen with a prolapsed gravid uterus tempted me to diagnose intraperitoneal rupture of the bladder, the absence of any history of urinary trouble and the ease with which the uterus could be pushed up made me doubt and I consulted a surgeon. I felt if my diagnosis proved incorrect I might find myself up against something beyond my capacity.

Dr. U. P. Sinha, F.R.C.S.E., Lecturer in Surgery, took over the case. The following is his report:

"On examination I was convinced that it was a surgical case but the diagnosis remained uncertain. On opening the abdomen a large amount of blood-stained fluid welled out of the abdomen. On further exploration it was found that the peritoneal aspect of the bladder had a perforation which admitted a thumb. The margin of the perforation was black and necrotic. Obviously, it was a spontaneous rupture due to necrosis. This was stitched up, the abdomen closed without drainage and bladder drained suprapubically.

A week later the patient aborted but up-to-date (24-4-43) she is doing quite well.

### References


Bailey, Hamilton—Quoted by Beresford-Jones, *Brit. J. Surg.*, **29**:155, 1941, from Chisholm and Ferguson, *Brit. M. J.*, **2**:647, 1939.

Berkeley, Bonney and MacLeod—The Abnormal in Obstetrics. Published by Edward Arnold & Co., London, Pp. 139-40, 1938.

Cloye—*J. Obst. & Gynæc., Brit. Emp.*, **48**:235, 1941.

Eden and Holland—A Manual of Obstetrics .Eighth Edition. Published by J. A. Churchill, Ltd., London, p. 143, fig. 65, 1937.

Munro-Kerr—Operative Obstetrics. Fourth Edition. Published by Balliere, Tindall and Cox, London, Pp. 372-73, 1937.

Williams—Obstetrics. Fifth Edition. Published by D. Appleton & Co., London, p. 644, fig. 476, 1923.


(*Continued from page 120*)

ing, shoes and other essential commodities. However, this system has serious inherent weaknesses, especially when simple eligibility and needs tests cannot be developed and the Germans abandoned it for rationing of clothing. A number of factors have to be taken into consideration when determining which technique is to be used for rationing of a certain commodity. The first test which every rationing technique must meet is its suitability to the supply and demand situation. Some techniques are more restrictive than others and if a great reduction of consumption is desired certain techniques have to be used rather than others. For example, selective rationing is generally the most restrictive technique, while point rationing is the least restrictive. Rationing techniques differ greatly in the degree of flexibility they permit; and, other things being equal, it is highly desirable to provide the maximum flexibility both to the consumers and to the administration. Experience has shown that the point system is the most flexible, value rationing probably comes next while the uniform allowance type of rationing is probably the most rigid.

A highly important test for every rationing program is whether it makes possible the greatest fairness. Uniform allowance rationing ranks low from the point of view of equitability; the same is true with regard to the point system; permit rationing and differential rationing can be given much higher ratings. Unquestionably a combination of the first and the last two types would be best. It must be recognised, however, that a rationing system which makes possible the maximum equitability will require a very extensive and efficient administrative apparatus and will be exceedingly complex in its regulations. A rationing system which is simplest to understand, simplest to explain to the public and simplest to administer, is to be greatly perferred to more complex types of techniques, unless it would give birth to an intolerable number of other evils.—Extracts from an article by Albert Viton. *J. Am. Dietet. A.*, **19**:18, 1943.

## RESEARCH FUND (INDIAN MEDICAL ASSOCIATION)

The following donations to the Research Fund (Indian Medical Association) are gratefully acknowledged:—

1. Rai Bahadur Dr. T. N. Banerjee, M.B., M.R.C.P. (Lond.), D.T.M. & H., Patna Rs. 1,000/-
2. Dr. Bhupal Singh, B.A., M.B., Meerut „ 1,000/-
3. Dr. S. N. Banerji, L.M.F., Meerut „ 1,000/-
4. Dr. A. Said, Karachi .. „ 1,100/-
5. Rai Bahadur Dr. Jayanta Rao, L.M.S., L.R.C.S., Cuttack .. „ 50/-
6. Dr. Panchanan Chatterjee, M.B., F.R.C.S. (Edin.), Calcutta .. „ 250/-
7. Major-General D. P. Goil, Meerut Rs. 500/-
8. Col. Sir Krishnaji V. Kukday, Kt., C.I.E., I.M.S.(R.), Nagpur .. „ 1,000/-
9. Capt. R. C. Goulatia, M.B., B.S., Lahore „ 101/-
10. Dr. G. K. Gan, M.B., Dhantoli & Sadar, Nagpur .. .. „ 51/-

P. B. MUKERJI,
*Hony. General Secretary, I.M.A.*

JOURNAL OF THE

INDIAN MEDICAL ASSOCIATION

*CALCUTTA, JANUARY, 1944*

## THE ACCESSORY LOBE OF THE AZYGOS VEIN

After Wrisberg[1] described this abnormal condition, it has been reported from time to time by anatomists, pathologists and radiologists. The total number of cases in world medical literature is difficult to guess. Since 1923, this abnormality has been frequently described by radiologists. Allen[2] found a similar accessory lobe of the lung very frequently in porpoise and Debré and Mignon[3] quote Testut as stating that in fœtus the accessory lobes are found in about 25 per cent. The number of cases reported by clinicians and pathologists after postmortem examination is few. Radiologists report a frequency of this condition from 0·07 per cent (Litten[4]) to 2·6 per cent (Bourdellés and Jalet[5]). Undoubtedly this is a rare condition but its presence should be kept in mind in obscure physical findings of the chest.

An ordinary fissure in the lung consists of two layers of visceral pleura. The azygos vein following an abnormal course, carries with it as it is displaced downwards in its new position, both the visceral and parietal layers. The vein lies in the pocket formed at the base of the septum. To the septum in the lung the term "mesoazygos" has been given by Hjelm and Hultén[6]. Stibbe[7] in a dissection on cadaver found that the mesoazygos "is attached along a line on the thoracic wall; the attachment commences posteriorly at the right side of the fifth thoracic vertebra, passes obliquely upwards across the posterior parts of the intercostal spaces to the middle of the second rib, and then downwards and forwards to the first costal cartilage, where it disappears in the parietal pleura of the front of the thorax. The free margin of this fold is concave and contains between its two layers the azygos vein". The aberrant vein can be demonstrated radiologically as a "dense comma-shaped shadow" (Mather and Cope[8]) but it may also be pea-like, pear-shaped or even horse-shoe-shaped (Nelson and Simon[9]). The thin curved line is the mesoazygos in optical section. The line disappears on rotating the position of the patient and the dense shadow of the vein may be mistaken for a calcified area in the lung. Fig. II of Raman's article published elsewhere in this issue, shows the dense shadow at the lower end of the mesoazygos nicely. In Fig. I of the same article, the line has terminated above in a triangular zone which has been called the "commisural triangle" (Levy and Cade[10]) and the "triangle d' implantation" by D' Hour and Fertin[11]. This radiological picture may be mistaken for a shadow of the thymus in children. Slight splitting of the mesoazygos has been observed in the absence of any known pathological cause. But separation of the layers has been observed when the right lung has been collapsed by artificial pneumothorax (D' Hour and Fertin, *loc. cit.*) or in a pleural effusion (Bendick and Wessler[12]). It has been suggested that an interlobar effusion is responsible for the separation in these cases.

Heredity probably plays a part in the ætiology of this abnormal course of the azygos vein as suggested by Suess[13]. Investigating this factor, Underwood and Tattersal[14] found that this condition was present in one other member of the family in each of their two cases.

The accessory lobe of the azygos vein is attacked with diseases as any other part of the lung. Pleuritis, atelectasis, pneumonia and tuberculosis have been reported (Bacanu[15], Keijser[16]). Apart from diseases the existence of the accessory lobe is important when tubercular infiltration of the right upper lobe is suspected. Normally the lobe may give rise to dullness, altered breath sounds and even fine rales over the apical region. The rales are due to congestion of the lung medial to the mesoazygos. Mackmull[17] describes a case where for these physical signs a patient was treated 6 years for tuberculosis. No skiagram could be taken as the patient was mad and the azygos lobe was found on postmortem, when death occurred due to other cause. On the other hand, in the radiological picture the mesoazygos may be erroneously supposed to be the lateral wall of a cavity specially in Stibbe's position C. For these reasons when tuberculosis of the right apex is suspected special attention should be given to this area in the radiological examination.

---

[1] Wrisberg, H. A.—Observationes anatomicæ de Vena azyga duplici aliisque hujus venæ varietatibus. Gottingen, 1778.

[2] Allen, W.—*J. Anat. Physiol.*, **16**:605, 1882.

[3] Debre', R. and Mignon, M.—*Rev. France de Pédiatr*, **7**:143, 1931.

[4] Litten, F.—*Deutsche med. Wchnschr*, **55**:400, 1929.

[5] Le Bourdelle's, B. and Jalet, J.—*Presse méd.*, **39**:1623, 1931.

[6] Hjelm, R. and Hulte'n, O.—*Acta radiol.*, **9**:126, 1928.

[7] Stibbe, E. P.—*J. Anat. Physiol.*, **53**:305, 1919.

[8] Mather, J. H. and Cope, R.—*Brit. J Radiol.*, **1**:481, 1928.

[9] Nelson, H. P. and Simon, G.—*Brit. M. J.*, **1**:9, 1931.

[10] Levy, A. and Cade, R.—*Lyon méd.*, **147**:513, 1931.

[11] D' Hour, H. and Fertin, J.—*Bull. et mém. Soc. méd. d'hôp. de Paris*, **48**:1140, 1932.

[12] Bendick, A. J. and Wessler, H.—*Am. J. Rœntgenol*, **20**:1, 1928.

[13] Suess, E.—*Med. Klin.*, **24**:1790, 1928.

[14] Underwood, E. A. and Tattersal, N.—*Tubercle*, Oct., p. 7, 1933.

[15] Bacanu, C.—*Ztschr. f. Tuberk*, **80**:355, 1938.

[16] Keijser, S.—*Nederl. tijdischr. v. geneesk.*, **1**:326, 1929.

[17] Mackmull, C.—*Am. Rev. Tuberc.*, **22**:286, 1930.

# CURRENT COMMENTS

## FOOD CRISIS & NUTRITIONAL REQUIREMENTS

1. The Bengal Medical Relief Committee, having taken into consideration the food requirements of different age and sex groups of the population in Bengal, is of the opinion that the basic caloric requirements of man increase with growth from 500 calories per day at the age of one month to 1,000 calories per day at 12 months, to 1500 calories at the age of 5 years, reaching 2,400 calories at the age of twelve years and above, and that additional calories are required according to the degree of physical activity at the rate of 100 to 300 calories per hour of active work undertaken. This Committee is further of the opinion that the protein requirements diminish gradually from 5·0 grammes per kg. of body weight from 0-1 yr. to 1·5 grammes per kg. of body weight between 18-21 years. For infants below six months, all the protein supplied should come from milk. Up to the age of 3, most of the protein should be of animal origin, chiefly milk. In later years, part of the milk can be replaced by fish, meat and eggs. Between the ages of 10-15 years, of the total protein consumed, 25% may come from vegetable proteins. Between 16-21 years, the vegetable proteins can be increased up to 50% of the total protein requirements. Later, the intake of animal protein may be reduced to even 1/3rd of the total protein requirements. In prescribing a dietary for the population, mineral requirements, particularly with regard to calcium, phosphorus and iron and also the various vitamins (pro-vitamin A, vitamin A, vitamins $B_1$ and $B_2$, nicotinic acid, ascorbic acid or vitamin C, vitamin D and other vitamins), have to be borne in mind, if the optimum requirements of nutrition are to be aimed at. Pregnant women and nursing mothers require more calories, more animal proteins and more vitamins.

The Committee is further of the opinion that in tackling shortage of food in any area, the above points have to be borne in mind, and that priority of supply of milk, vitamins and minerals should go to infants and children, and expectant and nursing mothers.

Since there is a shortage of supply of milk and milk-products and also of vitamins generally in the country, the Committee emphasizes the importance of producing more milk, and of animal proteins in the form of fish, along with energetic crop planning for the other food requirements of the population. Since, in times of food shortage and shortage of fresh fruits and vegetables which are rich in vitamins and mineral salts, vitamins cannot be made available sufficiently from these sources, the Committee requests the Government and the University Laboratories to manufacture synthetic vitamins and vitamin concentrates to meet the demands of the abnormal situation and to implement the supply by importation from abroad, if possible. If cow's milk or concentrated milk is not available in adequate quantities, the Committee urges the Government to prepare milk substitutes from soya bean, ground nut and malted barley with additions of mineral salts and vitamins. Furthermore, more milk may be made available by limiting by law, the production of casein or *chhana* either for industrial purposes or for making sweetmeats. The whey obtained from the limited production of casein should also be conserved and utilised for feeding children and invalids.

II. The Committee points out that the quality and quantity of gruel prescribed by the Government of Bengal supplies only 825 calories per feed, that it is deficient in many dietary essentials apart from protein and calories, and that the proportion of *bajra* is too high to prevent diarrhœa in large sections of the unaccustomed consumers. This diet is not suitable for infants and young children. Bajra, if it is to be added to the gruel at all, should be reduced in quantity and should be crushed and soaked in water overnight to improve its assimilability on cooking for at least four hours. The Committee suggests the following composition for a gruel meal (=modified gruel) for an adult person, yielding 1,275 calories:—

Rice 20 seers; Pulses 5 seers; Potato, sweet potato, pumpkin, bhendi, sags 8 seers; Salt 1 seer; Spices ¼ seer.

*N.B.* Sugar 1 to 2 parts with onion improves the taste and flavour. The total gruel with water is made up to 65 seers. 1 chhatak of this gives 85 calories, or 15 chhataks 1275 calories.

If rice is not available and if wheat is available, chapatis made of 3 chhataks of wheat flour per adult person per meal may be supplied along with vegetables cooked with pulses. The formula of the latter may be as follows, yielding 847 calories:—

3 chhataks wheat—588 calories, ¾ chhatak pulses—147 calories, 2 chhataks potato, sweet potato, yams or root crops—112 calories, I chhatak leafy vegetables—nil. Total 847 calories.

Calories may be increased by allowing some sugar to this ration. Salt and curry powder with onions will improve taste and flavour.

III. *For Infants and children:* The Committee is deeply concerned about the appalling malnutrition and deaths among infants and children, who are the first to suffer from protein and vitamin starvation. The effects of the starvation from protein, vitamins and mineral salts are reflected in the anæmia, œdema, diarrhœa and emaciation which are so prevalent among the starved children. The Committee draws the attention of the Government to the seriousness of the situation and requests them to pay immediate attention to it. The Committee urges the immediate establishment of hospitals for the care of such infants and children at a comparatively early stage of malnutrition and thus save them by timely treatment and reduce the death roll. The dietary of infants and children requires special consideration in terms of the food requirements noted above.

(*a*) If milk is available, the following formula is suggested:—

| | | | |
|---|---|---|---|
| 1st month | 500 calories | .. | equal amount of water for dilution. |
| 2nd „ | 600 „ | .. | 2 parts of milk to 1 part of water. |
| 4th „ | 700 „ | | |
| 6th „ | 850 „ | .. | Whole milk. |
| 12th „ | 1200 „ | | |

*N.B.* One chhatak of whole milk provides 35 calories.

(*b*) If milk is not available, the following formula for substitute milk is suggested:—

Take 1 part of flour of roasted soya bean, 1 part of flour of roasted ground nuts and 1·5 part of flour of malted

barley. Mix 1 part of above mixture with 7 parts of water and boil. Sieve through cloth. (Calories same as those of milk).

(*c*) For infants and children with weak digestion, predigested protein foods like peptonised milk, proteoses and peptones should be supplied.

With any one of the materials above, each child should receive at least 2 feeds a day, preferably three.

Every effort should be made by the Government to manufacture fish liver oil to meet the vitamin requirements of infants and children, as well as of expectant and nursing mothers. Pure vitamin A obtained by technological processes may also be made available for the prevention and treatment of all cases of nutritional diarrhœa and dysenteries.

The Indian Red Cross Society is distributing (Dean's) evaporated milk to various organisations for feeding babies and expectant and nursing mothers. This milk contains 8 per cent fat and 19·2 per cent of non-fatty solids—proteins, sugar and salts. About one-half of the non-fatty solids consist of milk-sugar, of which the average normal strength is about 4 per cent in cow's milk and about 7 per cent in human milk. When this evaporated milk is diluted 1 in 5, according to the instructions of the Red Cross authorities, it contains only 3·8 per cent of non-fatty solids as compared to 8·5 per cent which is the legal standard for pure cow's milk. The concentration of milk sugar is also proportionately reduced. Thus the diluted "evaporated milk" is deficient in non-fatty solids, including sugar, by over 50 per cent. According to requirements, the sugar content of this diluted (1 in 5) milk may be brought up to the standard of cow's milk or human milk, as the case may be, by adding 1¾ oz. or 4 oz. of sugar respectively to every one-pound tin of the evaporated milk (to make a total of 5 pounds of diluted milk). But even if the sugar content is made good in this way, the quantity given (half pound) to babies for a feed is utterly inadequate to usefully meet their nutritional requirements. Unless these deficiencies are corrected, the feeds as recommended at present by the Red Cross authorities will remain extremely defective.

IV. Experience has shown that starving people when they are first served with food at the Relief Centres, cannot tolerate the quantity and quality of the "standard" gruel meal, or milk, as the case may be. Considerable discretion is needed to choose the dietary for them for the first few days. The following scheme of feeding is suggested to carry them through the first few days before they are able to digest the "standard" meal (gruel or milk).

*1st day*: Barley, or rice, or flour (*maida*)—Make a conjee by boiling 1 chhatak of this in 10 chhataks of water; to the cooled conjee add 1 chhatak of sugar and the juice of 2 limes. The above quantity may be increased in the course of the first day if the patient recovers sufficiently. Calories contained in the above mixture—556.

*2nd day*: Milk 1 seer. Sugar 1½ chhatak. Conjee (as above) 10 chhataks. Calories obtained—1100.

*3rd day*: Milk 1½ seer. Sugar 2 chhataks. Conjee 10 chhataks. Calories obtained—1636.

*4th day*: Modified gruel as advised by this Committee—10 chhataks. Calories—850.

*5th day*: Modified gruel as advised by this Committee—1 seer. Calories—1360.

In order to offer the different Relief Kitchens the necessary medical advice, the services of medical men should be made available at these centres during the feeds. The Bengal Medical Relief Committee is willing to offer the voluntary services of doctors and senior medical students as advisers to these kitchens. Applications are to be addressed to the Bengal Medical Relief Committee, 67 Dharamtala Street, Calcutta.

## FOOD SITUATION IN INDIA

*A Memorandum of the Medical Profession in Bombay to the Prime Minister of Great Britain, London, the Secretary of State for India, London, His Excellency the Viceroy and Governor-General of India, New Delhi, and His Excellency the Governor of Bombay, Bombay:*

1. This meeting of the Medical Profession in Bombay held on 4th November 1943, feels alarmed at the worsening food situation in Bengal, Orissa, Malabar and some South Indian States and fears that similar conditions are likely to arise in Bombay and Madras Presidencies and similar deficit areas unless the British Government, the Government of India, the Provinces, States and Local Administrations take co-ordinated, comprehensive and energetic measures to remedy the same. The meeting submits the following Memorandum for your earnest consideration.

2. The meeting desires to draw the earnest attention of the authorities concerned to the contrast presented by the food position in Great Britain with the same in India. Before the war, Great Britain had to import nearly 50 per cent of its food from abroad. From the year 1939, all food grains were controlled and sold to the consumers at fixed rates. *Milk, eggs, fats and meat, but not food grains,* were rationed throughout the island. The Food Ministry spent nearly 129 million sterling in one year alone (1941-1942) as subsidies to food industries and to meet the deficit involved in giving imported food to the consumer at fixed rates; hoarders and defaulters were given exemplary punishments. The result is that the retail prices of all foods are only 25 per cent above their pre-war rates. From the nutritional point of view, it is significant to note that the Secretary to the Food Ministry announced in the Parliament in 1940 that "Government fully recognised the paramount importance of milk in the diet of the people and regarded it essential to maintain its supplies adequate". Every mother and child in England is getting about one pint of milk a day and in the case of the poor it is supplied free. Lord Woolton told the Parliament "that many people were fed more adequately now than before the War." And all this was done in spite of the fact that Great Britain suffered directly due to intensive bombing and sinking of ships.

3. India, on the other hand, is not an active field of war and being mainly an agricultural country has not to depend much on imported food and yet the prices of food grains have gone up by 250 per cent in Bombay Presidency and by 600 per cent in Bengal. The prices of nutritious foods like milk, meat and vegetables in Bombay have gone up by 300 per cent. This contrast in prices between Great Britain and India is clearly

due to want of effective control over production, distribution and marketing of food articles. Many other factors also contributed to the abnormal increase in price levels in food trade and to scarcity, especially in Bengal, with the result that in Bengal to-day thousands are dying every week of starvation. Out of the two million people in Bengal that are fed on rich gruel by Government or voluntary agencies, nearly half must have previously been wage-earners or middle class people who could not buy even cereals at the current rates on the wages they get. Production of food is thus hampered and a vicious circle is set up.

4. Nutrition experts in India emphasize that ½ lb. of milk and ½ lb. of vegetables are the bare minimum required by an adult per day for repair and vitality and that every mother and child must get at least a pint of milk per day for growth and vitality. Even in a city like Bombay which is the first to introduce rationing, the wage earners and middle class people have to spend most of what they earn, including the dearness allowance that some of them get, on food grains, oil, rent, fuel, clothing and such other essentials and can afford to buy hardly half an ounce of milk and 1·5 ozs. of vegetables per person per day. But if we consider the Province as a whole, we find that very few get the advantage of this dearness allowance. The great mass of people have to live on starvation diets mainly due to high prices of foods; many of them, therefore, flock to cities for employment or begging, as is seen in Bengal. Such a low consumption of milk and vegetables should, therefore, be taken as a warning that the stamina of the people is getting dangerously low and epidemic diseases will take a fearful toll of life unless the supply of these foods is increased and their rates are lowered.

5. The Government of India has taken at long last, some decisions based mainly on the recommendations of the Food Grains Committee. In the opinion of this meeting these are halting in character and are not comprehensive. *Firstly*, no definite measures are taken to bring down the abnormally high prices of foods by giving subsidies, where necessary, as is done in England. *Secondly*, the Food Grains Committee considered only grams but not the great variety of other pulses, beans and soya-beans which are important in the diet of the poor. This neglect at the Centre is probably reflected in pulses and beans being kept out in rationed articles in Bombay, with the result that their prices have risen nearly 400 per cent and the diet of the labourer has become excessively starchy and unbalanced. *Thirdly*, the Government of India apparently does not give much importance to the inclusion of dairy produce in the dietary of the people, otherwise they would have appointed, simultaneously with the Food Grains Committee, a Milk Committee to go into the question of dairy products. *Fourthly*, another source of nutritious food which has been overlooked is fish. India has a vast sea-board and an indigenous fish-curing industry which has not been properly explored. Dried fish keeps well for about three months and can be transported to long distances as dry food. It is a cheap and nutritious food for the poor. Government of India and Local Governments should develop this industry rapidly by giving subsidies and other facilities to fishermen.

6. All the same, the Food Grains Committee admits that the Food problem is a part of the War effort and its settlement is as urgent as any that confronts the country in military terms. It also admits that the food crisis is likely to remain for a few years more. It admits that in the past, questions of food supply and nutritional policy were unduly neglected and the Committee emphasizes the fact that Indian nutritional standards are deplorably low.

7. In the opinion of this meeting the natural corollary to these findings should be for the Government of India to adopt plans for the production and rationing of both energy foods and body-building foods. The food problem in India is undoubtedly vast and intricate owing to the presence of many States and Provinces with some independence to them in internal administration; but it must be tackled as a War measure with the co-operation of people and for the good of all.

8. This meeting of the Medical Profession is of the opinion that the food situation will not materially improve unless the prices of common foods are brought within the purchasing power of the masses by importing food forthwith, by increased local production and by subsidies to make up the difference between the purchasing and the selling price. At the same time rationing must be introduced in all towns above a population of 5000, to be extended universally as soon as possible. England and other countries have done this and thus kept the people well-fed. India can and must do the same whatever the cost and labour involved. *The alternative is chaos, starvation, pestilence and irreparable damage to the young.*

9. Large tracts of the deficit areas in India, a partner of the allies in this War, are now on the verge of starvation, in spite of the measures taken so far, thus indicating the necessity for radical change in policy.

10. This meeting therefore urges British Government to help India out of this chaos by immediate help in kind. The Government of India, the Provinces and States acting as one Unit, must also spend out of their balances kept for post-war reconstruction and out of taxation funds to maintain the *Food Front* on the same level as the War Front.

11. In conclusion, this meeting of the Medical Profession in Bombay submits the following recommendations to the authorities concerned for their earnest consideration. In doing this they have taken into consideration, the measures recently taken by the Government of India and the Bombay Government and have made such recommendations only as were either not suggested before or on which, in the opinion of this meeting, sufficient emphasis was not laid:—

(*i*) British Government should send to India, now and for the next few years as a part of their help in kind by providing the necessary shipping, food grains, dried skim milk and butter for use in deficit areas. Such a supply will help to bring down the prices of local foods to some extent.

(*ii*) British Government should also send urgently a large number of drying plants for preparing butter, skim-milk and whole-milk powder. The establishment of these plants by the local Governments in suitable rural areas firstly in deficit Provinces and later on in other Provinces, will give stimulus to dairy industry, will provide a supplementary but ready

and cheap supply of milk to cities and will solve the problem of transporting 85 per cent of water in milk to long distances during war time. In peace time such plants will be a valuable addition to the dairy industry in India. At present, the skim milk after the extraction of butter is so treated as to make it useless as food to human beings.

(*iii*) The Government of India should share with the Provincial and local Governments and Indian States, the financial responsibility of supplying foods at normal rates. Large ports like Calcutta, Bombay, Madras and Karachi and other big cities where either fighting forces or war industries, railway workshops, cotton or jute mills are working, should receive additional consideration from the Government of India.

(*iv*) Every district in the deficit areas should be made as self sufficient as possible in the matter of milk and vegetables which are perishable and so cannot be stored and transported cheaply and quickly during war time. *The slaughter of milch cattle and farm animals should, therefore, be stopped forthwith.* Government has lost touch with large sections of the public during the last two years. A fresh attempt should be made through District Conferences, to get in touch with representative farmers and public men of the district with a view to get their co-operation and meet their requirements in the "Grow More Food" campaign.

(*v*) The Village Industry of dried and salted fish should be rapidly developed.

(*vi*) Prices of common food articles should be lowered so as to be within the purchasing power of the masses, and rationing should be introduced in deficit areas in all towns above 5000 population and later on universally. Cereals, pulses, sugar, oils, ground-nuts, milk and meat should be included in the rationed articles. If the necessary staff cannot be secured, voluntary organisations should be requested to co-operate in the interest of starving Indians.

(*vii*) The Bombay Province is a deficit area as regards food. The presence of thousands of military personnel, refugees and war prisoners have still further depleted its supply of milk, meat and vegetables. As war with Japan progresses, the Central Government may not be able to send its quota of food to this Province because of shipping and internal transport difficulties. It is, therefore, urgently necessary *for this Province to be considered as an area of potential scarcity* and to start long term and short term measures for the increased production and conservation of food.

(*viii*) The demands of Bombay City and Suburbs are very great as regards vegetables at reasonable rates. No serious efforts are yet made by either Government or the local people to utilize the Tata Hydro-Electric Company's waste water which flows in three rivers within 75 miles of Bombay. This source of water should be fully utilized for the purpose.

(*ix*) The milk supply of Bombay is also an urgent problem. The buffalo sheds in the City and Suburbs are costly to maintain owing to high prices of cattle food, city rent and transport difficulties. They should, therefore, be shifted to Palghar and beyond to cheaper and more suitable surroundings, within a year. Arrangements should also be made to bring milk to this city from other near sources. *Milk must be controlled and selectively rationed if mothers and children are to be saved from malnutrition.*

(*x*) The Government of Bombay has taken a strange attitude that in taking measures for food supply to cities they will not be justified in using the money realised by taxes from all over the Province. But increased production is helping the agriculturists also and, therefore, the argument is not quite correct. Moreover, Bombay and Suburbs are giving Excise, Entertainment and Property Tax to Government. The Bombay Government can also ask the Central Government to give subventions from excess profits tax collected from Bombay for the supply of food articles. But Bombay Government can not side-track their responsibility to provide these foods at normal rates. The Government has already built a fund of nearly four crores for post-war purposes from balances built up during the war years. A part of this fund should be utilized for the purpose of nutrition.

(*xi*) Government should constitute a permanent Board of Nutrition for this Province, one of the functions of which would be to carry out inquiries in important towns and villages, in schools and also in industrial areas. The Board should keep Government informed regarding the state of nutrition of the people from time to time and suggest means for its improvement.

## TECHNIQUES OF RATIONING

The techniques of rationing, if not unlimited, are multiplying rapidly. New techniques are constantly being discovered, old ones are being refined and made more complicated. The method of rationing has to be adapted to the commodity. It would be impossible to ration automobiles, for example, by the coupon system unless all durable consumer goods were rationed; on the other hand, to ration sugar by the method of individual permits used for rationing of automobiles, tires, and bicycles would be administratively absurd and highly inefficient. Sugar can be rationed most effectively by the simple "uniform allowance" system, or, if maximum fairness is desired, by the system known as "differential" rationing.

Under the former rationing scheme the consumer is restricted to a fixed quantity of each article for a fixed period and all consumers are allowed to obtain an equal quantity of the article. The ration allowance can be, and frequently is, changed from time to time according to the supply. The coupons are

usually made valid for specified periods and if the supply is very limited, registration with retailers may be required. This system can be used with greatest advantage for articles which are of universal consumption, the demand for which is inelastic and fairly equal, and when supplies are sufficient to allow every person in the community a certain quantity.

The differential type of rationing is used when it is desired to allow various classes of the population to obtain varying quantities of the rationed article. Certain foodstuffs and other commodities which are of special importance to specific groups—the sick and infirm, children, special types of laborers—might be rationed by this method. Differential rationing has been used extensively in Germany and Italy as a weapon of war and as an instrument for implementing a definite social and racial philosophy; these countries have sought to attract laborers to certain war occupations, notably mining and steel making, by allowing higher rations, and to exterminate certain groups within their own countries and conquered peoples elsewhere by the denial of food-stuffs. In Italy, for example, heavy laborers are given 25 per cent more bread than ordinary consumers, while those in very heavy industries receive an additional bonus of 25 per cent. Great Britain, on the other hand, has followed a policy of providing the maximum possible ration for all civilian consumers, rather than larger rations for one class at the expense of another. The extra need of men and women engaged in certain occupations are provided by other means, notably by factory canteens which serve food outside of the rationed allowance and the so-called British restaurants which provide reasonably good meals at very low prices.

There is much to be said for differential rationing. Unfortunately, however, differential rationing is exceedingly complicated and requires an immense staff of full-time paid officials to administer it. The needs of individuals have to be examined carefully and the complexities of administration increase with each refinement of the scheme. In other words, the more equitable the rationing scheme is, the more complicated it becomes; the greater the difficulties of administration, the more expensive it becomes and the more loopholes are opened for favouritism and corruption. It is very doubtful whether it will be necessary to develop differential rationing on an extensive scale in this country. The need for this type of rationing increases as rationed allowances are reduced closer to the subsistence level, when it becomes necessary to make special provision for special needs. It is very doubtful whether the shortage of foodstuffs will ever become so serious in this country that it will be necessary to set ration allowances near the subsistence level. As far as one can foresee we shall always have an adequate margin of safety, especially in view of the fact that only a small proportion of foodstuffs is likely to be rationed here.

This war is responsible for the discovery of a new type of rationing known as the "point" system. If the originator of this scheme could be paid dividends, he would be one of the richest men in the world by now. Indeed, in England "points" have become a second currency. Under this scheme article which is rationed by points bears a certain point value and a consumer is allowed to "spend" in a given period a certain number of points. Both point values of articles and the number of points allowed to consumers are changed from time to time. The consumers can then spend his points in any manner he desires. For example, if he is allowed 10 points and a can of sardines costs 10 points, a can of beans 2·5 points, and a can of spinach 5 points, the consumer can use his 10 points either to buy one can of sardines, or 4 cans of beans, or 2 cans of beans and 1 can of spinach, or any other combination he desires.

The advantages of this scheme are very great. First and most important, it makes possible a very high degree of personal choice, which is exceedingly desirable, and reduces to a minimum the amount of interference with the consumer's normal buying habits. Secondly, it is very flexible, since the value of each article as well as the value of the coupons can be changed from time to time; thirdly, it does not require registration with retailers; fourthly, it does not require much administrative supervision. This technique has witnessed the greatest extension since the outbreak of the war. It has been used almost everywhere in Britain in rationing of clothing, and it has been expanded to other fields. The British authorities experimented with point rationing for distribution of canned foodstuffs obtained from the United States. The success of the scheme, and the universal approbation which it met among the British public, have prompted the authorities to expand it greatly. At present all types of canned meats, meat products, fish, fruits and vegetable, condensed milk, cereal breakfast foods, rice, sago, and tapioca, dried peas, beans and lentils, dried fruits, etc., are rationed under the point system.

Another method of rationing is by money value. Each person is allowed under this scheme to purchase that quantity of the rationed article which he can obtain for a set amount of money. Meat has been rationed by value in England and the weekly ration has generally consisted of 20 to 25 cents' worth of meat a week. This type of rationing is most applicable to commodities which vary greatly in quality and in cost, as well as in their intrinsic value.

It would be manifestly unfair to set a quantity ration of meat which would permit each individual to buy, say, one-half pound of meat a week. Poor people having to purchase the lowest grades of meat would get mainly bones and meat of the lowest quality; high income groups would be able to obtain one-half pound of solid steak and thus in reality be able to obtain more than their poorer neighbours. Moreover, such a system would make distribution very difficult, as the demand would be concentrated on the better cuts. Under the value rationing system normal distribution can be maintained and individual preference is given free play. A person desiring to spend his ration allowance of 50 cents on a few ounces of choice cuts can do so; on the other hand, one desiring to obtain more in weight at the expense of quality, can obtain one or two pounds.

Under the "individual permit system" special permits are issued to applicants allowing them to purchase one or more of the rationed articles. These permits are given on a basis of definite regulations which normally include eligibility and needs tests. This system can be used to greatest advantage for articles the supply of which is strictly limited and the need for which is not universal. Automobiles, tires, and a number of other durable goods lend themselves excellently to this type of rationing; in Germany, however, because of the serious shortage of supplies, the individual permit system was used also for cloth-

*(Continued on page 114)*

# CURRENT MEDICAL LITERATURE

## MEDICINE

### Some Observations on Biliary Pains

Douglas (*Brit. M. J.*, **1**:10, 1943) points out 5 types of biliary pain met with and tries to explain each type in the following way:

(1) Dull ache in waves across central epigastrium because of embryonic derivation of the bile passages from the foregut innervated by the 8th and 9th thoracic nerves. (2) Symmetrical pain radiating from the back of the neck over the clavicles, explained by the mesodermal elements of the bile passages deriving from the septum transversum and thus supplied by primary positional nerves C3, 4 and 5. (3) Accurately located pain just below the right costal margin. Here there is friction between the inflamed gall-bladder serosa and the anterior parietal peritoneum setting up a 'peritoneal-cutaneous radiation'. (4) Penetrating pain into back at angle of the right scapula. This is explained as in the third but in that instance, the posterior parietal peritoneum is involved. (5) Shoulder-tip pain, evidently caused by concomitant hepatitis which permits the diaphragm to become vibrated and pain referred through the phrenic nerve branches.

### Gastric Acidity in Pulmonary Tuberculosis

Kruger (*Am. J. Digest. Dis.*, **10**:111, 1943) from a study of the gastric acidity of 325 patients in various stages of pulmonary tuberculosis observes that as the degree of the disease progressed, the incidence of gastric anacidity increased, that significant fever caused an increase in incidence of achlorhydria, that anæmia *per se* did not affect the degree of acidity and that the presence or absence of free acid played no role in the development of intestinal tuberculosis.

### Primary Atypical Pneumonia*

Correll (*Naval M. Bull*, July, 1943) writes that the outstanding clinical symptoms in a series of 155 unselected clinically similar atypical pneumonias were rapid onset with chilliness, intermittent or remittent fever lasting six to eight days, sore throat, non-productive cough becoming productive in four to seven days, and headache. Physical findings frequently developed late, and their paucity, when compared to the extensiveness of x-ray findings, was quite striking. Resolution as demonstrated by x-ray, usually took about twenty days. The infrequence of complications and sequelæ, frequency of migration and delayed resolution, and failure to respond to sulphonamides, were the other characteristics of importance. Not infrequently a febrile period of one to two days with temperature of 100°F. and a few chest findings may, on x-ray, prove to be an extensive pneumonia requiring twenty or more days for resolution. The proper x-ray technic is important in order to avoid overlooking this type of pneumonia. The radiographs must be made with a so-called light technic, that is, the dorsal spine should not be visible through the cardiac shadow. In 23 patients given x-ray therapy within four days of admission, failure to respond to treatment occurred once (4·4 per cent). In the remainder (95·6 per cent) the febrile period, total number of sick days, and the failing to resolve within 30 days on routine or other treatments, as evidenced by radiologic studies 7 (77·7 per cent) cleared to x-ray within an average of 4·0 days following one or two roentgen treatments of 112 "r" units each. Twenty-two and three-tenths per cent failed to be benefited by x-ray treatment. Roentgen therapy, in this series, showed definite promise in shortening the sick period of acute cases; it appears to be of definite value in shortening the period of delayed resolution; and may be of aid in decreasing the incidence of complications. Its further trial in similar cases in suggested.

### A Study of Fatal Leukaemia*

Krishbaum and Preuss (*Arch. Int. Med.*, June, 1943) report that in this paper 123 fatal cases of leukæmia were reviewed and the histories and observations critically examined. This represents 0·86 per cent of 14,400 consecutive cases in which autopsies were performed from 1929 to March 1941. Classification was made according to clinical course as acute leukæmia or chronic leukæmia; according to cell type in the peripheral blood, bone marrow and tissues as stem cell leukæmia, myelogenous leukæmia, lymphatic leukæmia, monocytic leukæmia, and, finally according to whether the disease was leukæmic or aleukæmic. In this series about 70 per cent of the patients were male, 30 per cent female, 78 per cent white and 22 per cent coloured. The high incidence of acute leukæmia in the older age group in this series is unusual. Stem cell leukæmias occurred most frequently in persons in the first three decades. The symptomatology of leukæmic disease is reviewed, and the relative frequency of the symptoms commonly observed in various forms of leukæmia is discussed. Previous observations by other authors that acute leukæmia of all types presents a typical and almost pathognomonic syndrome can be corroborated. Enlargement of the liver and the spleen was most commonly encountered in myelogenous leukæmia and less frequently in lymphatic leukæmia. Generalized lymphadenopathy was the outstanding abnormality in lymphatic leukæmia and stem cell leukæmia. Marked anæmia was observed in all forms of leukæmia. The white blood cell picture showed considerable variability and fluctuation. Attention is drawn to the observation that marked leukopenia may be observed in the early or the late stages of stem cell leukæmia and myelogenous leukæmia, especially in the acute forms. Marked thrombopenia may cause a hæmorrhagic diathesis. Repeated transfusions of blood produced the most beneficial results in these cases but gave only temporary relief.

### Effect of Desoxycorticosterone Acetate on Plasma Volume and Electrolyte Balance of Normal Human Subjects*

Clinton and Thorn (*Bull. Johns Hopkins Hosp.*, **72**:255, 1943) write that this study was undertaken to determine whether or not the administration of desoxycorticosterone acetate increased the plasma volume of normal human subjects. The daily intramuscular administration of 10 milligrams of desoxycorticosterone acetate in sesame oil to four normal subjects resulted in a considerable increase in plasma volume in all. The maximum increase occurred on the fourth

day of treatment. The increase persisted throughout the period of therapy (5-15 days). Following withdrawal of treatment, plasma volume fell to normal or slightly below within a period of three days. The magnitude of the changes in plasma volume was not significantly influenced by diet or supplementary sodium chloride administration. The sublingual administration of 30-40 milligrams of desoxycorticosterone acetate in divided doses was much less effective than 10 mg. once daily intramuscularly in inducing an increase in plasma volume in normal subjects. Although the simultaneous administration of supplementary sodium chloride did not augment the increase in plasma volume following desoxycorticosterone acetate therapy, the total quantity of sodium chloride and water which was retained during the period of synthetic hormone treatment was increased appreciably. Supplementary sodium chloride alone was followed by a slight increase in plasma volume. No evidence of toxic symptoms was observed in normal subjects treated with desoxycorticosterone acetate during a relatively short period (5-15 days). Similar reactions have been encountered in patients with Addison's disease who have received excessive quantities of desoxycorticosterone acetate and supplementary sodium chloride.

### Treatment of Anaemia by Red Cell Transfusions*

Alt (*J.A.M.A.*, **122**:417, 1943) writes that the extensive use of human plasma in recent years has made available large quantities of red blood cells which have been in the most part discarded. This preliminary report discusses the use of red cell transfusions in the treatment of anæmia and the substitution of these transfusions for those of whole blood. A patient with progressive, refractory anæmia was sustained for a year with transfusions of the red cell suspension obtained from 25·5 litres of blood. Smaller series of red cell transfusions were given to a number of paients with various types of anæmia. For example, six red cell transfusions were given to a man aged 64, whose blood type was B, with an aplastic anæmia. Blood from two donors is usually given at a single transfusion. As the author points out, because red cells are a by-product in the preparation of blood plasma, it is practical to give them in larger amounts and more frequently than has heretofore been the practice with whole blood.

### Sulphonamide Resistance in Gonorrhoea

Petro (*Lancet*, **1**:35, 1943) writes that sulphonamide resistance in gonorrhœa may be of three types—acquired, relative and absolute.

Possible factors governing absolute or relative resistance are conisdered in the light of observation on 956 cases of male gonorrhœa.

An *in vivo* and *in vitro* investigation of 44 cases of male gonorrhœa shows that 5 resistant and 1 relatively resistant strains of gonococci were responsible for 6 cases which failed to respond to adequate sulphonamide treatment. Investigation of the female host of one sulphonamide-resistant strain of gonococci supported the view that such a strain can be transmitted from one host to another. The development of resistant strains is probably favoured by inadequate dosage, haphazard tests of cure and the premature cessation of treatment in defaulters.

Until new compounds effective against sulphonamide-resistant strains are evolved, or means found for resensitizing these strains, treatment in cases infected with a sulphonamide-resistant organism must be by irrigations or artificial fever.

## TROPICAL MEDICINE

### Tropical Eosinophilia

Weingarten (*Lancet*, **1**:103, 1943: Ref. *Trop. Dis. Bull.*, **40**:407, 1943) writes that since 1943 the author has seen in India 81 patients suffering from what he believes to be a new disease. The illness starts with lassitude, anorexia, evening fever and loss of weight. After some days a paroxysmal dry cough, expiratory dyspnœa which may last weeks, and sometimes recurring attacks of nocturnal asthma develop, the physical signs resembling those of asthma. The sputum is scanty, tenacious and mucopurulent with no organisms of any significance; it frequently contains clumps of eosinophil cells but Charcot-Leyden crystals and Curschmann spirals are rarely seen. X-ray examination from the 4th to the 6th week shows disseminate mottling of both lung fields, especially marked at the hilar regions and at the bases; an average single focus is about the size of a split pea and has a moderately intense central shadow and an ill-defined and blurred outline. The blood shows a most marked eosinophilia, which is responsible for the considerable leucocytosis; the percentage of eosinophil cells, in one case as much as 88 per cent, is higher than in any other diesase except eosinophilic leukæmia. No parasites are to be found in the blood, and the stools and urine show nothing unusual. There may be a mild secondary anæmia, the erythrocyte sedimentation rate is moderately increased, the blood chemistry is normal and the spleen is slightly enlarged.

The disease, not infrequently diagnosed as chronic phthisis or bronchial asthma, runs a benign course, although if untreated it may last for years. It is not considered to be an allergic manifestation and has no connexion with Loeffler's syndrome. The cause has not yet been determined.

Treatment was symptomatic until administration of neoarsphenamine to a paient suffering also from syphilis was followed by subsidence of the respiratory symptoms and a fall in the leucocytes from 64,200 to 7,800 per cmm., representing a decrease in the eosinophils from 71 to 16 per cent. Arsenical treatment of other patients suffering from the syndrome was then undertaken and the results were similarly favourable. There appear to have been no relapse. The ætiology is unknown, but most of the patients seen lived near the sea.

### A Study of the Deficiencies of Polished Rice in Relation to Beriberi

Vedder (*Am. J. Trop. Med.*, **23**:43, 1943, Ref. *Trop Dis. Bull.*, **40**:557, 1943) carried out an interesting experiment of feeding rats on a diet of polished rice and adding various synthetic constituents of vitamin $B_2$ as indications arose, noting the time when these occurred and the results of the additions and he gives in the following lines the summary of his findings:

1. Polished rice is known to be deficient in thiamin ($B_1$). 2. Polished rice is also known to be deficient in the fat soluble vitamins, A, D and E. 3. Polished rice is also deficient in organic salts, particularly calcium and iron. 4. Polished rice has been shown in the experiments to be deficient in the

following vitamins of $B_1$ complex: pyridoxin $B_6$, riboflavin, pantothenic acid and choline. 5. The clinical picture of dry beriberi as it occurs on a rice diet with its nerve and cord degeneration and muscular atrophy is caused by a complicated vitamin deficiency including at least all of the above vitamins.

### Neurological Contribution to the Clinical Picture of Typhus

Wenschr (*Deutsche. med. Wochnschr.*, **68**:984, 1942 Ref. *Trop. Dis. Bull.*, **40**:382, 1943) writes that the diagnosis of typhus can be facilitated in the early stages by neurological signs. The first indication is sudden high rise in temperature accompanied by a quite typical and unusually stubborn headache which responds only slightly to analgesics. An additional sign is hardness of hearing which occurs in almost all cases. If these signs are accompanied by speech disorders and the characteristic twitching of the perioral muscle, the diagnosis of typhus exanthematicus is assured even without a distinct exanthem.

Therapy consists in relieving the pressure. Apathy or restlessness responds quickly to lumbar puncture, circulation and respiration definitely improve and the distressing headache disappears. Along with the essential care which must be paid to the cardiovascular system, the main therapeutic concern is the prompt reduction of increasing pressure in the C.S.F. For this reason strophanthin should always be given in strongly concentrated glucose solutions which exert a dehydrating action. After damage to the vasomotor and respiratory centres, the next most important danger is the occurrence of bulbar paralysis. Recovery from the other nervous symptoms which may appear is usual, and they do not endanger life.

### Ocular Complications in Relapsing Fever

Hamilton (*Brit. J. Ophth.*, **27**:68, 1943) from observation in an Australian General Hospital on 28 cases of relapsing fever from the Western Desert and 63 cases from Syria writes that only 4 of the cases from the Western Desert developed uveitis but none from Syria had eye trouble, that the ocular complications met with were acute iridocylitis and chronic cyclitis associated with persistent headache, tnat gross vitreous exudate was a marked feature in both forms, that sufferers from iridocyclitis developed massive posterior synechiæ which were readily broken down by mydriatics, that despite iridocyclitis and vitreous changes no choroiditis was found and the prognosis regarding vision is stated to be good. The author further points out that the eye complications were unilateral and they are delayed and as such the cause may sometimes escape detection. The author suggests that the Syrian fever is tick-borne and the Western Desert fever is louse-borne and this may explain the greater liability of the latter to cause ocular complications.

### Toxic Amaurosis due to Quinine: Treatment with Sodium Nitrite Administered Intravenously

Pelner and Saskin (*J.A.M.A.*, **119**:1175, 1942) report that a Negro woman suffering from malaria and having 45 grains of quinine in three days became totally blind. The pupils were dilated and did not react to light and the fundi revealed a condition simulating bilateral occlusion of the central artery—a large area of œdema extended from each optic papilla outwards, above and below the macula and beyond it for a distance about 1 disc diameter; a cherry red spot was seen in each macula, the retinal arteries were contracted, the veins somewhat dilated. Prostigmine methylsulphate (1 in 2000) 2 c.c. was given hypodermically and 1 grain of sodium nitrite every 2 hours by mouth with no apparent result. 1 c.c. of sodium nitrite solution was given intravenously and this was repeated after 4 hours. Two further injections of sodium nitrite were given. The response to the nitrite injections was dramatic. A 2 per cent ethylmorphine hydrochloride 1 drop in each eye three times a day was also given. Sight returned but there was an almost concentric 10 to 15 degrees residual contraction in the visual field of each eye.

### The Airplane, a Possible Means of Transmission of Disease

Jackson (*Virgina M. Monthly*, **69**:29, 1942. Ref. *Trop. Dis. Bull.*, **40**:563, 1943) writes that extensive development of aviation has two great disadvantages: its use as a destructive implement of warfare, and its danger of conveying infectious diseases, such as cholera, plague, smallpox, typhus, yellow fever, malaria and dengue. The incubation periods of these diseases vary from two days to two weeks; therefore, a pilot or a traveller can easily become infected before departure and break out with the disease a day or so after reaching his destination. During the incubation period he can be a dangerous carrier of the disease. It has been proved that airplanes transport mosquitoes, house flies and other insects.

Fortunately, up to the present time there has not been a serious spread of disease by airplanes. Findlay suggested this possibility in the recent eastward spread of yellow fever from endemic zones in West Africa to the Southern Sudan.

Yellow fever should be given some special consideration because of its possible transmission not only by Aedes aegypti but by twenty-two other species of mosquitoes, certain flies, bedbugs, ticks and cockroaches. Dengue is also transmitted mechanically by two types of Aedes, including A. ægypti and possibly two others, so that a dengue "reservoir" may be found in uninhabited jungle areas. Malaria, it is said by Simmons, exceeds all other infectious diesases in sapping the vitality and impeding the social, industrial and political progress of the inhabitants of many tropical countries. While Anopheles quadrimaculatus is thought of as the vector, there are at least eight other species of the Anopheles group that have different modes and location of habitation. Recent discoveries have introduced new problems: search for still unknown vectors and hosts of jungle infections, methods of protecting exposed persons and precautions against the spread of these diseases from infected centres. The author quotes Kolmer, who says: "Once any of these become epidemic in the United States it is probable and possible that our own various insects may become conveyors or vectors of the organisms from animal to man or man to animal."

To prevent the spread of these infections the countries concerned have adopted certain general precautions; systematic destruction of mosquitoes on all airplanes, vaccination of all flying personnel and careful inspections of passengers to eliminate those who are infected. The Pan-American Sanitary Code, in addition to this, agrees to present certificates which

show where passengers have embarked and where they visited six days prior to a given embarkation. Such a certificate is not required of a passenger if his trip originated in a latitude south of 30 degree south, unless he has deplaned for more than one day north of this latitude.

For destruction of mosquitoes in aircraft to be effectual a suitable sprayer and insecticide (which is highly toxic to insects, innocuous to passengers, non-inflammable, non-corrosive, non-staining, stable in all climates and readily miscible with water) is essential. Water soluble pyrethrum concentrate diluted ten to fourteen times with water immediately before spraying is commonly used. About 30 c.c. of a 1:15 solution per thousand cubic feet (28 cubic meters) of a space is sprayed by a nebulizer. The plane is sprayed about a half hour before landing, and its ventilators are closed for about ten minutes after spraying. Airplanes may be fumigated and opened prior to the embarkation of passengers.

In addition to the vaccination of the flying personnel it is wise for all passengers intending to travel by air through yellow fever areas to be inoculated. Protection begins about a week after inoculation and is effective against urban and jungle types of the disease, lasts about two years. A third precaution, the medical inspection of passengers, the care and surveillance of contacts, is the most difficult to carry out.

Certain special measures are adopted if plague, cholera, typhus or smallpox are encountered or suspected: (1) the aircraft is cleaned thoroughly; (2) the passengers and crew are examined; (3) any person showing symptoms of any one of these diseases is excluded; (4) the personal effects of the personnel are inspected, if necessary. If plague is found, the following additional measures are used: immediate disembarkation of the sick persons; surveillance of contacts and suspects for not more than six days; disinfection and disinsectization of personal effects and deratization. For cholera the same measures are used as for plague except that the period of surveillance is five days and the drinking water is disinfected and the containers emptied and disinfected. In addition, the unloading of fresh fish, shell fish, fruit and vegetables is banned. This is also true if the airplane has come from a cholera-infested area. For typhus the measures are the same except that delousing is done and the period of surveillance is twelve days. For smallpox vaccination and surveillance for no more than fourteen days are carried out.

Commander Jackson concludes that careful regulations under the direction of thorough and competent health officers with adequate equipment and personnel may be the sum and substance of controlling a condition that has tremendous potentialities for spreading disease and death.

## PEDIATRICS

### Effects of Various Urinary Antiseptics on Strains of Escherichia Coli

Helmholz (*Am. J. Dis. Child.*, **65**:399, 1943) writes that resistance to sulphathiazole is manifested by a small percentage of strains of Esch. coli. Strains resistant to sulphathiazole were also resistant to urinary acidity and mandelic acid but were more susceptible to methenamine and methenamine mandelate than nonresistant strains. Sulphathiazole and sulphadiazine seem to be more effective against Esch. coli than sulphacetimide, sulphapyridine and sulphanilamide. In concentrations of 0·05 mg. per hundred cubic centimeters sulphathiazole is more effective than sulphadiazine.

### Acute Lymphatic Leukaemia in Childhood

Falkenstein and Fowler (*Am. J. Dis. Child.*, **65**:445, 1943) write that the aleukæmic and the leukæmic forms of acute lymphatic leukæmia in childhood occur with about equal frequency and they present no essential differences in their clinical picture except that the leukæmic form tends to pursue a somewhat more acute course and to produce more pronounced lymphoid hyperplasia. The aleukæmic form is more difficult of diagnosis and more easily mistaken for aplastic anæmia, arthritis or an acute infectious process. Rœntgen therapy of acute lymphatic leukæmia is effective in alleviating pressure symptoms due to enlarged glands but is of no value, or actually harmful, in the absence of these symptoms. Transfusions are of but slight palliative benefit.

### Infarction of the Liver and Hypoprothrombinaemia

Kaplan and others (*Am. J. Dis. Child.*, **65**:259, 1943) report the case of a newborn infant with a bleeding diathesis occurring at birth but failing to respond to adequate parenterally and orally administered doses of vitamin K preparations and with the necrospy showing a massive infarction of the left lobe of the liver. That the infarction was present prenatally is indicated by the morphologic alterations within the liver.

The authors note that clinically the presence of hæmorrhagic manifestation at birth coupled with an inadequate or no response to adequate vitamin K therapy must indicate not only serious hepatic dysfunctions but a severe pathologic state of the liver. In fact, the absolute prothrombin level and when the level is lowered the degree and duration of its elevation following the administration of vitamin K can be used as an extremely sensitive index of the physiologic integrity of the liver. They maintain that when new-born children, therefore, present such a clinical picture infarction of the liver, though singularly rare, must be included in any comprehensive differential diagnosis.

### Encephalitis Complicating Measles

Litvak and others (*Am. J. Dis. Child.*, **65**:265, 1943) in reviewing 53 cases of measles encephalitis observe the following points of importance:

Incidence of symptoms referable to the central nervous system in measles is from 1 in 1000 to 1500. Three types of onset of encephalitis have been observed: (1) convulsions or convulsions followed by coma (50 per cent); (2) listlessness, drowsiness, stupor and coma (40 per cent); (3) delirium, irritability and excitement (10 per cent). The average time of onset of encephalitis is between the 4th and 5th day after the appearance of the rash. There is no correlation between the severity of the attack of measles and the occurrences of encephalitis and also between the severity of the onset of encephalitis and the prognosis for life and sequelæ. The longer the neurologic signs persist, the more frequent are sequelæ and the more unfavourable is the prognosis. The spinal fluid findings are not pathognomic of the disease and there is no relation between the state of the spinal fluid and the severity of the attack of encephalitis and the outcome of the individual

patient. Sudden rise in temperature, headache, convulsions and lethargic stupor appearing in the course of measles are danger signals. The cause of this encephalitis complicating measles is still debated and whether the histologic changes are due to inflammation or to toxic degeneration is still under discussion. The prognosis for life and sequelæ should be guarded.

The following therapeutic procedures and agents have been used by various observers: 1. Lumbar puncture to reduce intracranial pressure, to alleviate headaches and to control convulsions. 2. Inhalations of chlorform and ether; administration of magnesium sulphate intravenously, intramuscularly, orally, and by rectum, and use of sodium amytal to control convulsions. 3. Sedatives for cerebral agitation and restlessness. 4. Magnesium sulphate and concentrated dextrose used intravenously when there is increased intracranial pressure. 5. Hydrotherapy employed when there is high temperature. 6. Convalscent measles serum administered intrathecally, intravenously and intramuscularly (no evidence of its efficacy). 7. Blood transfusions occasionally used. 8. Physiologic solution of sodium chloride and dextrose administered intravenously to patients in coma. 9. For the treatment of patients with bulbar paralysis: (*i*) Maintaining the patient in the Trendelenburg position. (*ii*) Avoidance of feeding by mouth. (*iii*) Continual intravenous drip of physiologic solution of sodium chloride and dextrose. (*iv*) Use of gavage feedings. (*v*) Suction of mucus from throat. 10. Use of Drinker's respirator for respiratory paralysis. 11. Administration of sulphathiazole, sulphadiazine and amphetamine sulphate (no evidence of their efficacy). 12. Inoculation with encephalitis vaccine (herpes F. strain, Matheson Commission) (value not definitely established). 13. Foreign protein therapy as recommended by Hamilton and Hanna, mixed typhoid vaccine being used intravenously. 14. Symptomatic treatment:—(*i*) Close attention to the skin to prevent ulceration. (*ii*) Administration of sufficient fluids—by mouth, by hypodermoclysis or intravenously. (*iii*) Catheterization when necessary. (*iv*) Suction of mucus from the throat in bulbar involvement to prevent aspiration pneumonia. (*v*) Hydrotherapy. (*vi*) Support for paretic extremities

## OBSTETRICS AND GYNAECOLOGY

### The Influence of Hormones upon Varicose Veins in Pregnancy*

McCausland (*West. J. Surg. Obst. & Gynæc.*, May, 1943) observes that while analysing the histories of the 150 patients who received injection treatment of their varicose veins during pregnancy, three outstanding endocrine manifestations were noted. First, the incidence of spontaneous abortion in patients with varicose veins was extremely low; second, one-third of these cases were of a definite endocrine type, as determined by body build, distribution of hair, and abnormal menstrual history; third, varicose veins developed during the antepartum period, this being the time when marked hormonal changes were occurring.

From these observations it was reasoned: patients with varicose veins who have a low incidence of spontaneous miscarriage should have a relatively high level of progesterone since this hormone is known to relax uterine muscle. Perhaps, then, this relatively high level of progesterone is an etiological factor in relaxing the smooth muscle in veins, ureters, gallbladder, and in gastrointestinal tract, all of which are so frequently affected during pregnancy. With this hypothesis in mind, an attempt was made to relieve the subjective and objective symptoms of varicose veins in pregnancy by the administration of estrogenic substance, in the form of Progynon B. Definite relief of disabling symptoms from varicose veins occurring during pregnancy was produced by the administration of 25,000 to 50,000 I. U. intramuscularly every five to seven days, or 10,000 I. U. given intramuscularly every two days. Administration of large doses of estrogenic substance during pregnancy does not produce miscarriage or premature labour; nor does it have any untoward effect upon the type of labour, delivery, postpartum course or the condition of the babies. It may be that the estrogenic substance given increased the sensitivity of the uterus resulting in comparatively short labours (average 8·6 hours) as well as the lack of postpartum hæmorrhage. Estrogenic substance has a place in the treatment of selected obstetrical patients with varicose veins not suitable for injection, but which produce disabling symptoms during the antepartum period.

### Breech Presentations Treated by Cephalic Versions in the Consecutive Deliveries of 1,700 Women*

Ryder (*Am. J. Obst. & Gynec.*, June, 1943) observes that fœtal mortality in breech deliveries is unduly high. Every breech presentation, therefore, is a potential danger to the unborn child. This danger can be removed by early external cephalic version, in the opinion of the author. Reliance should not be placed upon spontaneous version. Individual babies will suffer when this fails. Success in external versions depends upon early diagnosis of presentation by careful antepartum palpation. When diagnosis is in doubt, it can usually be made by vaginal examination and always by x-ray. External version should be performed gently and without haste. If it cannot be accomplished without force, the attempt should be abandoned. Carefully performed, the operation is not dangerous to fœtus or mother. The fœtus is in more danger from the breech presentation than from the version.

The operation is generally quite easy and usually may be performed without anæsthetic if tried early. The most frequent cause of failure is delay in making the attempt until late in pregnancy. The next most frequent cause is extended legs of the fœtus. The best time for performing external cephalic version is in the sixth and seventh calendar month, and breech presentations should not be allowed to persist beyond the seventh month without attempts at version. After this time, spontaneous versions are less likely to occur and artificial versions are more likely to require anæsthesia and to be failures. An obstetrician who lets a pregnant woman in his care go to term with a breech presentation undiagnosed, has usually not rendered the best service to his patient. External cephalic versions, systematically employed, can render the fœtal mortality following breech presentations to approximately that following vertex presentations.

*Abstracts marked with an asterisk (*) were received through courtesy of the United States Office of War Information*—Editor, *J. Indian M. A.*

# NOTES AND NEWS

## UNITY OF EAST AND WEST

"If we are to have a durable peace after the war, if, out of the wreckage of the present a new type of co-operative life is to be built on a global scale, then science and philosophy, the West and the East must play their part," said Dr. Bidhan Chandra Roy, Vice-Chancellor, Calcutta University, addressing the annual Convocation of Allahabad University on the 27th November last:

"The intellectual life of the world, so far as science and learning are concerned, is definitely internationalized, and whether we wish it or not, an indelible pattern of unity has been woven into the society of mankind. The East and the West cannot afford to ignore each other; the continued expansion of Western ideas is inevitable, and technical and scientific education on Western methods open up new avenues of knowledge and opportunity, which the East cannot overlook and which must, to a large extent, displace older traditions or schooling. If India is to exist, fulfil her mission and extend her vital humanizing influence in the world of the future, if she is to successfully withstand ever-growing competition, she must imbibe the best which the West can give.

"The problem that faces the nations of the East and the West today is how to win the war, and at the same time preserve those intellectual ideals and standards without which a military victory would, in the end, be nothing but ashes. History shows us that it is possible to lose a civilization, while armies and navies are triumphant. The peace must mean a better standard of living for the common man all over the world."

Stressing the need for unity among Indians, Dr. Roy implored the new graduates to shake off lethargy and discard a hesitating, halting inferiority attitude, and turn their thoughts and activities towards inter-communal, inter-racial and international unity. "Such unity does not imply a drab uniformity. Let strains of different culture and learning flow uninterrupted into one. May you never forget your rich inheritance from the time of Asoka; may you always preserve the treasures of the spirit, which you should hold in trust from the past, for the benefit of the generations to come."—*A.P.I.*

## CINCHONA CULTIVATION IN INDIA

The following are the replies given by the Central Government to the questions put by Sir A. H. Ghuznavi, M.L.A. (Central) in the Legislative Assembly on 13-11-43:

The area under cinchona cultivation at present is as follows:—Madras—3,429 acres, which is 756 acres more than when supplies from Java stopped and 1358 more than in 1939. Bengal—7,200 acres, which is 100 acres more than when supplies from Java stopped and 200 acres more than in 1939. The Bengal Government have also adopted a system of close planting which will give a larger yield per acre. The total average annual yields of quinine are respectively Madras—about 27,000 lbs. and Bengal—65,000 lbs.

The question what steps should be taken to prevent a recurrence of the present difficulties is a matter which will be considered by the Government of India in the light of conditions likely to prevail after the war and of developments in the production of synthetic antimalarial drugs.

It is understood that the Government of Bengal refused a request by a commercial concern for the allotment of land for the purposes of cinchona cultivation on the ground that all the suitable land available was required by the Government of Bengal for extension of their own cultivation.

The Government of India have taken steps to increase the cultivation of cinchona for production of quinine under a short-term method in the provinces of Bengal and Madras and have undertaken to meet the cost of the scheme.

## GOVERNMENT RELEASE OF QUININE TO D.M.A.

That the Government has agreed to release Quinine to the members of the Delhi Medical Association (Branch of I.M.A.) will be evident from the following letters of the Hony. Secretary, Delhi Medical Association and the Chief Medical Officer, Delhi Province, Delhi:

*Copy of circular dated 16-7-43, addressed by the Hony. Secretary to the members, D.M.A.:*

Our Association appreciates the difficulties that now prevail in obtaining supplies of Quinine for our daily use. The Executive Committee, therefore, decided to approach the Chief Medical Officer, Delhi, to find out ways of obtaining this drug for our members. I am glad to say that a very satisfactory arrangement has been arrived at between the Chief Medical Officer and our Association. A copy of the letter received from the Chief Medical Officer after our representation, is enclosed. From this letter you will see that certain conditions will have to be fulfilled by our members, but this is unavoidable in the present circumstances, though through our efforts and the very understanding attitude of the Chief Medical Officer these have been cut down to the minimum.

The Executive Committee requests each member who avails of this opportunity to obtain this Quinine, to use it very carefully and to avoid chances of leakage, to prepare Stock Solutions for dispensing purposes and keep a careful record of its disposal.

For your professional use the Executive Committee has recommended to the Chief Medical Officer that you be allotted, .....lbs. of Quinine Sulph. Powder. I am sending herewith a slip for the said amount which you will have to produce before the Chief Medical Officer for obtaining the drug and you will have to sign an agreement form as outlined in the Chief Medical Officer's letter. The price of the Quinine will have to be paid at the time of taking it.

For the convenience of the members it has been decided that the Association peon will collect their Quinine Registers on Saturday afternoon or Sunday morning for the Chief Medical Officer's inspection on Monday afternoon.

* * * * *

*Copy of a letter dated 8-7-43 from the C.M.O., Delhi Province, Delhi, to the Hony. Secretary, D.M.A.:*

In confirmation of the discussions with the deputation of members of the Delhi Medical Association about the supply of Quinine Sulphate Powder to doctors in Delhi. I am prepared to release upto 150 (one hundred and fifty) pounds of Government Quinine to the doctors named by you, that is, approximately *three pounds per head* for use in their practice at Rupees thirtytwo per pound.

You kindly undertook to let me have a list of the doctors and the amount suggested for each one.

We were agreed on the following conditions which each doctor will give a signed undertaking to accept.

(1) Each doctor must keep a register of the Quinine he issues showing the name of the patient. This register to be sent for my inspection every Monday. You very kindly offered to collect the registers in your office and send them to me.

(2) The doctor must sell the Quinine at the same rates which will obtain in the eight depots already established on which we agreed, namely:—

(*a*) If dispensed in powder from, cachets or capsules Re. 1|4|- for 75 grains (one treatment unit).

(*b*) If dispensed in mixture As. -|8|- for six five grains doses—the doctor supplying the bottle and other ingredients.

These prices we agreed give a sufficient margin for dispensing charges.

Doctors may still send their patients with a prescription to any of the depots where they may purchase upto one treatment unit (75 grains) at the above prices (the supply of the tablets is now exhausted). I must stress again, I am afraid, that it is highly unlikely that I shall have any more quinine for distribution this year. I ask for the help of your members in conserving stocks as much as possible. My most sincere thanks for your kindly co-operation.

## THE DRUGS CONTROL ORDER, 1943

The correspondence between Capt. H. N. Shivapuri, Hony. Provincial Secretary, U. P. Provincial Branch, I.M.A. and the Government of India together with the former's circular issued to the Branches of the I.M.A. in U.P. as also the letter from Mr. R. V. Fenton, Esq., I.C.S., Under-Secretary to the Government of India, Department of Industries and Civil Supplies, to the Jt. Secretary, Bombay Branch of the I.M.A. are published for general information.

*Letter no. 95/59/43-44 dated 22-11-43 from the Hony. Provincial Secretary, U. P. Provincial Branch to the Government of India:*

"Reference the *Gazette of India Extraordinary* dated 11-11-43; Notification No. 4750. 9(B)(1)/43 and called "The Drugs Control Order, 1943."

On behalf of this Association I submit the following points for the information of our members in various branches and request for an early reply to the same:—

1. *Clause 4.* Does this clause apply to doctors also, who have dispensaries for supplying medicines to their own patients only and if so, will they come under the heading of Retailers?

2. *Clause 5.* Have doctors to take the licence to purchase drugs from manufacturers, importers or wholesalers?

3. *Clause 6(2).* If the doctors have to take out licences as set out in clause 4, it will go very hard against those doctors who did not have their dispensaries before 1941 or who have established since or may start in future and what is the Government going to do to mitigate this hardship?

4. *Clause 13.* Does this clause as a whole or any part of it apply to doctors with their own dispensaries?

5. Are the doctors with their own dispensaries expected to keep a regular stock book under this Drug Control Order as upto now doctors have never kept a regular stock book as there has so far been no need for it.

6. Does this Control Order abolish the separate Provincial Control Orders on the subject or not?

An early reply is requested."

*Government of India's reply to the Hony. Provincial Secretary, U. P. Provincial Branch, I.M.A.:*

"I am directed to refer to your letter No. 95/59/43-44 dated the 22nd November, 1943 and to reply as follows to the points raised by you:

1. *Clause 4.* The term "retailers" does not apply to doctors who have dispensaries for the supply of medicines to their own patients.

2. *Clause 5.* Doctors are required to take a licence to purchase drugs from manufacturers, importers or wholesalers.

3. *Clause 6(2).* This sub-clause does apply to doctors having dispensaries for the benefit of their patients.

4. *Clause 13.* This clause will not apply to doctors having their own dispensaries.

5. The Drugs Control Order, 1943 does not require doctors to keep stock books except in as far as they are required for the preparation of the figures given in the application in form D.

6. The Drugs Control Order, 1943 will not supersede the orders issued by Provincial Governments regarding drugs and medicines unless the latter are cancelled by notification."

*Circular No. 16/43/44, dated 16-12-43 from the Hony. Provincial Secretary to Secretaries of all Branches in U. P.:*

In continuation of this office Circular No. 15/43/44 dated 4-12-43 the following further correspondence between this office and the Government of India are circulated for your information and the information of all the members concerned:—

*A. Hony. Provincial Secretary's letter to the Government of India.*

Ref. your letter No. 475-CS(D) (21)/43 dated 27-11-43.

*Your answer No. 3.* You have not given a clear answer to my query about those doctors who have qualified from 1941 or will qualify in future as they will not be able to prove that they had dispensaries in 1941, 1942 and 1943 as laid down in clause 6(2). Please let me know. They should be clearly made an exception under this clause and no obstacles should be put in their way of starting their own dispensaries if they so desire.

*Your answer No. 6.* If the Drugs Control Order does not supersede the Provincial Notifications on the subject, it will create a confusing situation, as for many Drugs, the prices laid down in the Provincial Notifications (I am referring to U. P. only) are at variance with the Govt. of India, Drug Control Order, 1943. Please see that this confusion is stopped as soon as possible.

I may also be allowed to point out that even in the Drugs Control Order, 1943, prices of several drugs are above what were prevalent in the market just before the Order came out, for example, Acid Boric, Aspirin, Glycerine, Liquid Paraffin etc., and prices of these articles have shot up since the Central Drugs Control Order was issued. Please rectify such errors, so that the manufacturers and others do not get more than their due share of profit.

An early reply is requested.

*B. Reply of Government of India to the above letter.*

I am directed to refer to your letter dated the 9th December, 1943 and to say that as already stated in our previous letter, sub-

clause 6(2) of the Drugs Control Order does not apply to doctors who maintain dispensaries and supply medicines to the public as an incidental part of their main profession of giving treatment. Such doctors do not require a retail licence and, therefore, do not have to show that they were practising before 1941.

On your second point there should be no confusion if there is a Provincial Notification controlling the price of any drug controlled by this Department's order. Both prices will be ceiling prices and naturally the lower price of the two will hold good.

The question of the further revision of price is under constant review.

I think this makes the position absolutely clear as far as medical men and their own dispensaries are concerned, but it must be clearly understood that they are only dispensaries for supplying medicines to their own patients only and not general chemists and druggists shops."

* * * * * *

*Copy of letter No. 475-CS(D)(21)/43, dated 16-12-43 from the R. V. Fenton, Esq., I.C.S., Under-Secy. to the Government of India, Department of Industries and Civil Supplies, to the Jt. Secretary, Bombay Medical Association, I.M.A., Bombay.*

Subject—Drugs Control Order, 1943.

I am directed to refer to your letter No. 27/43-44, dated 1-12-43 on the subject mentioned above and to say that clause 4 does not apply to the Medical Practitioners who provide medicines to their patients as an incidental part of their main profession of giving treatment. They, however, are required to take out purchase licenses under clause 5 of the Drugs Control Order.

## BENGAL RELIEF FUND (INDIAN MEDICAL ASSOCIATION)

The following contributions are gratefully acknowledged:—

1. Muttra Branch, I.M.A. Rs. 140/-
2. Deoria Medical Association Rs. 25/-
3. Dr. Mrs. S. M. Latif Rs. 10/-
4. Anonymous Rs. 100/-
5. Cownpore Medical Association (Branch, I.M.A.) Rs. 23/-
6. Sholapur Branch, I.M.A. Rs. 325/-
7. Lucknow Branch, I.M.A. Rs. 180/-
8. Tanjore Branch, I.M.A. Rs. 87/-
9. Amritsar Branch, I.M.A. (for medicines and medical comforts only):—
   - R. S. Dr. Hetram Aggarwal .. Rs. 50/-
   - Capt. M. Segat .. „ 28/-
   - Dr. M. Chopra .. „ 25/-
   - Dr. M. Kapoor .. „ 25/-
   - Dr. Baldeosingh .. „ 25/-
   - Dr. I. Bhatia .. „ 25/-
   - Capt. K. Mehra .. „ 25/-
   - Dr. Mangalsingh .. „ 22/-
   - Dr. A. Narula .. „ 21/-
   - Dr. Mrs. C. Chaitrath „ 21/-
   - Dr. Amir-ud-din .. „ 20/-
   - Major Ganapatrai & Daughter .. „ 20/-
   - Dr. Jogindersingh .. „ 20/-
   - Dr. J. Nayar .. „ 17/-
   - Dr. C. Bhatia .. „ 15/-
   - Dr. S. J. Kriplani .. „ 15/-
   - Dr. B. Nanda .. „ 15/-
   - Dr. M. Sonak .. „ 15/-
   - Dr. R. Malhoutra .. „ 15/-
   - Dr. S. Vohra .. „ 12/-
   - Dr. F. Shori .. „ 12/-
   - Dr. H. Mehta .. „ 10/-
   - Dr. G. Gulati .. „ 10/-
   - Dr. Pratapsingh .. „ 10/-
   - Dr. H. Singh .. „ 10/-
   - Dr. H. Madan .. „ 10/-
   - Dr. S. Chander .. „ 10/-
   - Dr. L. Mehra .. „ 10/-
   - Dr. K. Malhoutra „ 7/-
   - Dr. M. Paul .. „ 7/-
   - Dr. K. R. Khanna .. „ 7/-
   - Dr. Fakhar-ud-din „ 6/-
   - Dr. B. Upal .. „ 5/-
   - Dr. R. Khurranna „ 5/-
   - Dr. Harnam Singh „ 5/-
   - Dr. B. Gund .. „ 5/-
   - Dr. K. Vidyarthi .. „ 5/-
   - Dr. M. Vij .. „ 5/-
   - Dr. S. Muglani .. „ 5/-
   - Dr. G. Sahai .. „ 5/-
   - Dr. J. R. Seth .. „ 5/-
   - Dr. Sujindersingh „ 5/-
   - Anonymous .. „ 5/-
   - Dr. Durga Dutta .. „ 2/-
   - Anonymous .. „ 2/-
   - Dr. Manoharsingh „ 1/-
   - Anonymous .. „ 10/-

   Rs. 610/-
10. Gadag Branch, I.M.A.:—
    - Dr. M. S. Wagle .. Rs. 10/-
    - Dr. D. V. Kololgi .. „ 5/-
    - Dr. D. V. Chafekar „ 2/-
    - Dr. B. N. Huilgol .. „ 1/3/-
    - Dr. A. V. Umachigi „ 5/-
    - Dr. Eden .. „ 2/13/-
    - Dr. Watwe .. „ 2/-
    - Dr. Patil, R. R. .. „ 2/-
    - Dr. Patil, S. S. .. „ 1/-
    - Dr. Miss. Palit, P. „ 5/-
    - Dr. Miss. Bhaskar „ 2/-

    Rs. 38/-
11. Monghyr Branch, I.M.A.:—
    - Rai Bahadur Dr. K. P. Mitra .. Rs. 25/-
    - Dr. G. P. Chatterjee „ 10/-
    - Dr. A. Rasheed .. „ 20/-
    - Dr. D. K. Dutta .. „ 10/-
    - Dr. B. G. Bose .. „ 10/-
    - Dr. A. C. Ghosh .. „ 10/-
    - Dr. J. M. Gupta .. „ 10/-
    - Dr. P. N. Sinha .. „ 5/-
    - Dr. D. P. Sinha .. „ 10/-
    - Dr. D. P. Choudhury „ 5/-
    - Dr. J. Prasad .. „ 5/-
    - Dr. S. N. Sen .. „ 5/-
    - Dr. R. N. Pd. M.L.A. „ 5/-
    - Dr. M. N. Varma „ 5/-

    Rs. 135/-
12. Batala Branch, I.M.A.:—
    - Dr. Mulk Raj Singh Bhall .. Rs. 10/-
    - Dr. R. S. Bhalla .. „ 25/-
    - Dr. R. P. Khullar .. „ 5/-
    - Dr. G. R. Chhibbas „ 5/-
    - Dr. M. R. Mohey .. „ 5/-

    Rs. 50/-
13. Mrs. Atlantis (East) Ltd. (Calcutta) .. Rs. 100/-
14. Mrs. Ralph Paxton (Calcutta) .. Rs. 20/-
15. P. Banerji, Esq. (Mihijam) .. Rs. 100/-
16. Mrs. Sharman Medical House (Ludhiana) 3000 anti-malarial tablets "Tapnashi"
17. Mrs. Hind Chemicals (Cawnpore) .. Rs. 100/-
18. Mrs. W. T. Suren & Co. (Bombay) .. Rs. 1000/-
19. Dr. K. Krishnamurti (Chodavaram) .. Rs. 10/-
20. Dr. J. K. Thirunavukaralu, Medical Officer, Thirupuvanum, Ramnad „ 5/-
21. Kishanganj Branch, I.M.A.:—
    - Dr. S. C. Ghose, .. Re. 1/-
    - Dr. G. L. Ghose, .. „ 1/-
    - Dr. K. N. Moitra, .. „ 1/-
    - Dr. L. N. Lall, .. „ 1/-
    - Dr. N. G. Das, .. „ 1/-
    - Dr. E. Bonner, .. „ 1/-

    Rs. 6/-
22. Ambala Cantonment Branch,:—
    - Dr. Miss. A. Ghose Rs. 5/-
    - Dr. D. C. Bhall .. „ 10/-

    Rs. 15/-

P. B. MUKERJI
*Hony. General Secretary, I.M.A.*